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Wyoming

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Soil Inventory

of the

Grass Creek Area

Wyoming

Ellis G. Knox

Evan C. Nielson

Richard F. Wells

Prepared for the

Bureau of Land Management
in cooperation with the
Soil Conservation Service

Soil and Land Use Technology, Inc.
P.O. Box 1153
Columbia, Maryland 21044

July, 1979

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INTRODUCTION

A third order, semi-detailed soil survey of the Grass Creek Area, Wyoming, was carried out during the 1978 field season under contract to the Bureau of Land Management, U.S. Department of the Interior, in close cooperation with the Soil Conservation Service, U.S. Department of Agriculture. The soil inventory supports BLM programs to assess and plan the use of land resources, particularly range vegetation. The work also contributes to the SCS soil survey of Hot Springs and Park Counties.

The inventory was based on previous SCS work in Hot Springs, Park, Washakie, and Big Horn Counties and was carried out as a part of the National Cooperative Soil Survey under the review and correlation procedures of the SCS. The Grass Creek Area does not correspond to established publication areas; accordingly, the status of SCS correlation is considered to be informal.

SaLUT's field party consisted of Evan C. Nielson (field party leader), Lacy I. Harmon, and Burrell B. Lovell. The party received helpful guidance in the field from Jack E. Iiams, soil scientist, and Jimmie R. Bell, range specialist. The cooperation and support of the Soil Conservation Service and Bureau of Land Management at both local and state levels was excellent. Interorganizational teamwork was a key element in successful completion of the project. SaLUT very much appreciates being accepted as a responsible participant in the National Cooperative Soil Survey.

In preparation of the report, Messrs. Nielson, Lovell, and Harmon wrote the soil map unit descriptions. Mr. Richard F. Wells wrote the soil taxonomic unit descriptions. Photographs were taken by Mr. Nielson.

SURVEY AREA

General Nature

The Grass Creek Area (Figure 1) is in the central and western parts of Hot Springs County, west of the Big Horn River, and the southeastern part of Park County, southeast of the Greybull River. The Area extends about 45 miles from west to east and about 40 miles from north to south.

The entire Area drains into the Big Horn River through Owl Creek, Cottonwood Creek, Gooseberry Creek, Fifteen Mile Creek, the Greybull River, and other tributaries.

Elevations range from over 9,000 feet in western Hot Springs County near the boundary with the Shoshone National Forest to about 5,000 feet along the Greybull River to the northeast and to about 4,200 feet along the Big Horn River to the east. Most of the Area lies between 4,500 and 7,000 feet.

Most of the Area is dominated by tilted bedrock ridges and domes. Resistant rock beds form the crests of ridges that have an escarpment on the broken face and a relatively gentle back slope that is roughly parallel to the rock beds. The stream pattern partially conforms and partially cuts through these ridges. The larger streams have a flood plain and low stream terraces but most stream bottoms are very narrow. Gravel beds form erosional benches or depositional terraces in some parts of the Area. Rugged mountain slopes dominate the western part of the Area. Landslides are prominent on some of these slopes.

The bedrock is mostly soft shale. Some is clay shale rich in gypsum, other salts, and exchangeable sodium. Some is relatively free of salts and sodium. Relatively thin sandstone layers are interbedded with the shale. Some of these are resistant to erosion and form ridge crests. Near Thermopolis in the southeastern part of the Area, red shale beds, thick hard sandstone beds, and highly gypsiferous beds outcrop. Igneous and metamorphic rocks are in some parts of the mountains in the southwestern corner of the Area.

The soils have formed in residual material weathered from the bedrock, colluvium, alluvium, windblown material, and gravel deposits. In much of the Area, these soil parent materials are less than 40 inches

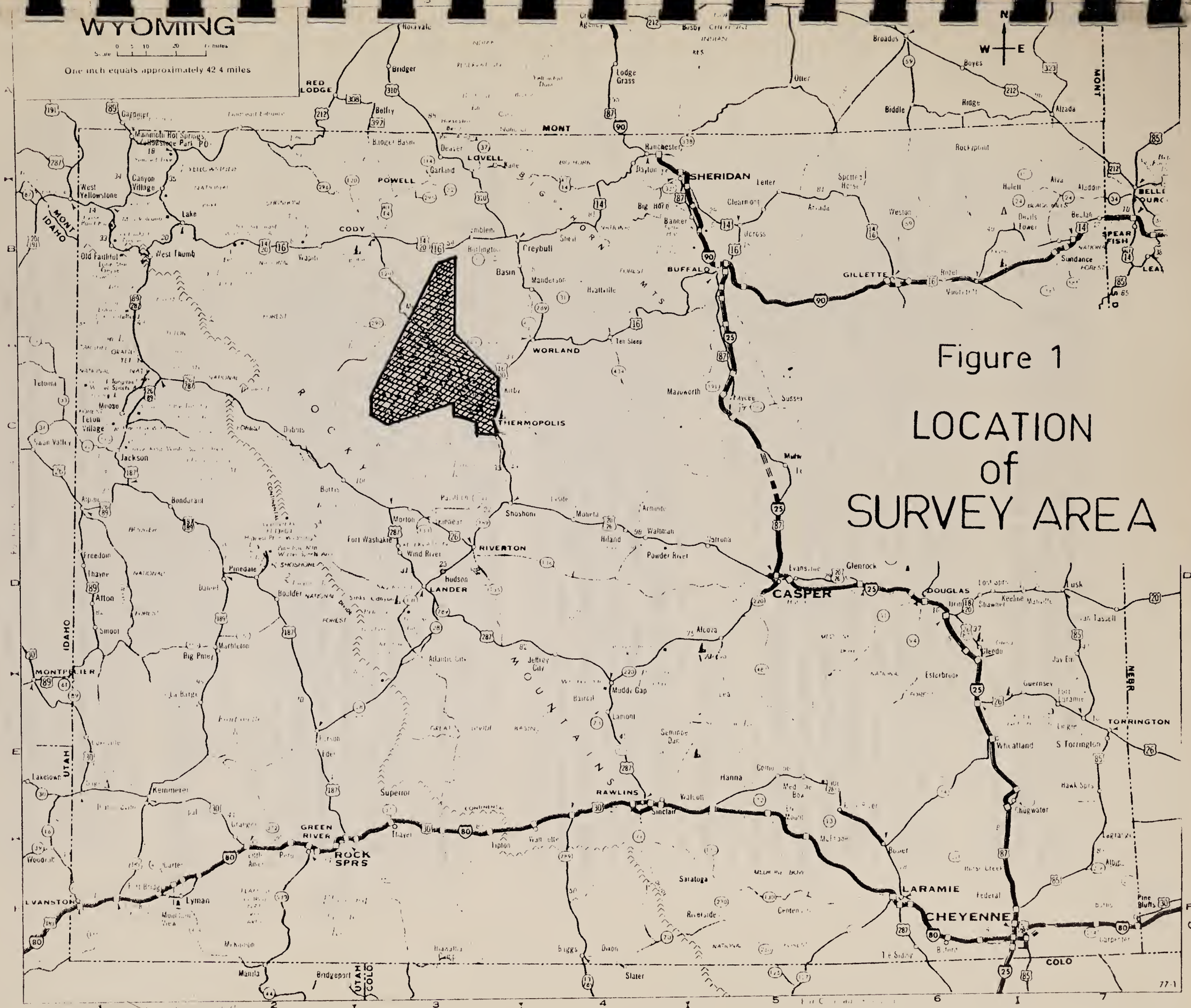


Figure 1

LOCATION of SURVEY AREA

thick; they are less than 20 inches thick in a significant portion of the Area. Most of the parent material contains lime; much is high in exchangeable sodium; gypsum is present in significant amounts in many cases.

The climate is continental and arid to sub-humid. Precipitation ranges from about 7 inches in the eastern and northern margins of the Area to 20 inches or more at the highest elevations in the southwestern corner of the Area. At the lower elevations, winters are cold and summers are warm with cool nights. Daily temperature ranges and variations from day to day are high. There is a moderate frost-free season in the eastern and northern parts of the Area. In the higher, western parts, no month can be considered entirely safe from frost or snow. Average annual temperatures are about 48° F in the lowest parts of the Area and range down to about 35° F with increasing elevation.

The natural vegetation includes desert shrub, shrub grassland, and conifer forest types. Grazing is the major land use for nearly all of the Area. Small forested areas are more important for forestry than grazing. Wildlife habitat is important throughout the Area. There is essentially no crop land. Oil and gas wells are common. There are gypsum and gravel deposits of possible commercial interest.

The land is largely controlled and administered by the Bureau of Land Management. There are about 5 to 10 private ranch headquarters within the Area.

Highway U.S. 20 runs north and south at the southeast margin of the Area. Wyoming 120 runs northwest and southeast through the Area. Other paved highways are Wyoming 431, 171, and 170. Gravel and graded earth roads serve ranching and petroleum activities. Grass Creek is a small petroleum-based community within the Area. The towns of Thermopolis, Meeteetse, and Worland are population centers near the Area.

General Soil Map

The broad pattern of soils in the Grass Creek Area is presented by a general soil map (Figure 2.) and legend (Table 1.). This map is of the same scale and similar in overall concept to the general soil map of Hot Springs County prepared by Jack Iiams. The general soil areas were redesigned and their boundaries redrawn according to the distribution of soils revealed by examination of the Grass Creek Area field sheets. The base for the general soil maps is a composite of the Thermopolis and Cody sheets of the U.S. Geological Survey 1:250,000 scale topographic map series.

Table 1. General Soil Map Legend

Map Symbol	Description
A.	Soils of Flood Plains
1.	Deep, nearly level, strongly to very strongly alkaline, well to somewhat poorly drained, loamy soils over stream alluvium. Typic and Ustic Torrifluvents, Typic and Ustic Torriorthents. Desert shrub vegetation dominated by greasewood.
2.	Deep, nearly level, neutral to moderately alkaline, well to somewhat poorly drained loamy and clayey soils over stream and fan alluvium. Ustic and Aquic Torrifluvents, Aeric and Typic Fluvaquents, Borollic Haplargids, Borollic Calciorthids, Typic and Argic Cryoborolls. Shrub grassland vegetation dominated by big sagebrush. Representative soils are Forelle, Adel, Clayburn, and Burnette.
B.	Soils of the Warmest and Dryest Zone
3.	Deep, nearly level to sloping, moderately to strongly alkaline, well drained, loamy and clayey soils over alluvium, shale, or sandstone. Typic Torrifluvents, Typic Torriorthents, Typic Natrargids. Desert shrub vegetation dominated by gardner saltbush or big sagebrush. Smaller amount of shallow and moderately deep, sloping to steep soils. Representative soils are Binton, Effington, Youngston, and Persayo.
4.	Shallow, sloping to steep, moderately alkaline, well drained, loamy soils over sandstone. Typic Haplargids. Shrub grassland dominated by black sagebrush, big sagebrush, and juniper. Hoot soils are representative.
C.	Soils of the Warmest Zone, Intermediate Moisture Status
5.	Deep and moderately deep, nearly level to sloping, moderately to very strongly alkaline, well drained loamy soils

over alluvial fill or outwash gravel. Ustic Torriorthents, Ustollic Haplargids, Ustollic Natrargids. Shrub grassland vegetation dominated by big sagebrush or gardner saltbush. Representative soils are Kim, Fort Collins, Cushman, and Larimer.

6. Shallow to deep, gently sloping to steep, moderately to very strongly alkaline, well drained, loamy and clayey soils over shale or sandstone. Ustic Torriorthents, Ustollic Haplargids, Ustollic Natrargids, Ustollic Camborthids. Shrub grassland or desert shrub vegetation dominated by gardner saltbush, big sagebrush, or black sagebrush. Representative soils are Epsie, Cadoma, Shingle, Tassel, Cushman, and Fort Collins.

7. Deep, gently sloping to steep, mildly to moderately alkaline, well drained, loamy and gravelly soils over gravelly deposits. Ustic Torriorthents and Ustollic Haplargids. Shrub grassland vegetation dominated by black sagebrush and big sagebrush. Representative soils are Nihill and Larimer.

8. Shallow to deep, nearly level to steep, mildly to moderately alkaline, well drained, loamy soils over red shale, sandstone, or gypsiferous shale. Ustic and Lithic Ustic Torriorthents, Ustollic Camborthids. Shrub grassland vegetation dominated by big sagebrush, black sagebrush, or juniper. Representative soils are Spearfish, Neville, Travessilla, Rekop, and Gystrum.

D. Soils of the Intermediate Temperature and Moisture Zone

9. Shallow to deep, gently sloping to steep, mildly to moderately alkaline, well drained, loamy soils over sandstone or shale. Ustic Torriorthents, Borollic Haplargids, Borollic Calciorthids. Shrub grassland vegetation dominated by low sagebrush, big sagebrush, or juniper. Representative soils are Blazon, Diamondville, and Forelle.

E. Soils of the Coldest and Most Humid Zone

10. Shallow to deep, gently sloping to very steep, neutral to moderately alkaline, well drained, loamy and clayey soils over sandstone, limestone, shale, bedrock, colluvium,

or alluvium. Lithic, Argic Lithic, and Argic Cryoborolls, Lithic Cryorthents, Typic Cryoboralfs. Shrub grassland and forest vegetation dominated by low sagebrush, big sagebrush, spruce, and fir. Representative soils are Starley, Starman, Nielsen, Bachus, Judkins, and Wetterhorn.

SOILS OF THE SURVEY AREA

The location and extent of the soils are shown on 31 field sheets (separate from this report). These field sheets are aerial photographs of approximately 1:24,000 map scale. Most sheets are centered on a 7.5 minute quadrangle. A few do not exactly correspond to quadrangle boundaries. Three sheets are composites of older photographs. Mapping is scheduled to be transferred by the BLM to 7.5 minute, 1:24,000 ortho-photo quadrangles as the ortho-photos become available. Because of variations in map scale, area measurements of the soils were not made on the field sheets.

Map symbols are explained in Tables 2 and 3.

The areas delineated on the field sheets are grouped into 111 soil map units. These are listed in Table 2 in numerical order. The map units are described in the Map Unit Descriptions section. Soil interpretations are presented in the Use and Management of Soils section.

In the Grass Creek Area, the soil map units, with few exceptions, are based on phases of soil series. The series are carefully defined classes at the lowest and most detailed level of the soil classification system (Soil Survey Staff, 1975). Most of the series have been formally recognized within the national SCS soil correlation program; some are permanently established and some are tentative. Tentative series are identified by (T) in Table 8. The variants listed are ad hoc series for soils too inextensive for formal recognition. This table gives the classification of the series. The series are described in the Taxonomic Unit Description section. Further information about these series is presented in the section on Genesis and Classification of Soils.

The components of some map units are great groups or miscellaneous areas rather than soil series. Great groups, such as Torriorthents, Fluvaquents, Torrifluvents, Cryoborolls, and Cryorthents are classes of the taxonomic system less closely defined that soil series. Miscellaneous areas, such as Rock outcrop, are parts of the landscape largely devoid of soil or vegetation.

Table 2. Identification legend and range sites.

Map Symbol	Map Unit (with components and their proportions)	Range Site
11	Larimer loam, 0 to 8 percent slopes	Loamy 10-14" PZ
11L	Larimer sandy loam, 0 to 8 percent slopes	Sandy 10-14" PZ
11T	Garland-Preatorson complex, 0 to 10 percent slopes	
	Garland loam, 0 to 10 percent slopes (65%)	Loamy 5-9" PZ
	Preatorson very gravelly loam, 0 to 10 percent slopes (25%)	Gravelly 5-9" PZ
45	Youngston-Glenton loams, 0 to 6 percent slopes	
	Youngston loam, 0 to 6 percent slopes (50%)	Loamy 5-9" PZ
	Glenton loam, 0 to 6 percent slopes (25%)	Loamy 5-9" PZ
46	Petrie-Kim alkali complex, 0 to 10 percent slopes	
	Petrie silty clay loam, 0 to 10 percent slopes (45%)	Saline upland 10-14" PZ
	Kim alkali loam, 0 to 10 percent slopes (30%)	Saline lowland 10-14" PZ
47	Petrie-Cadoma-Epsie complex, 0 to 15 percent slopes	
	Petrie silty clay loam, 0 to 10 percent slopes (55%)	Saline upland 10-14" PZ
	Cadoma silty clay loam, 3 to 15 percent slopes (25%)	Saline upland 10-14" PZ
	Epsie silty clay, 3 to 15 percent slopes (15%)	Saline upland 10-14" PZ
60	Cadoma-Kim complex, 1 to 10 percent slopes	
	Cadoma silty clay loam, 1 to 10 percent slopes (45%)	Saline upland 10-14" PZ
	Kim loam, 1 to 10 percent slopes (45%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
67	Cadoma-Worfka complex, 0 to 20 percent slopes	
	Cadoma silty clay loam, 0 to 20 percent slopes (55%)	Saline upland 10-14" PZ
	Worfka loam, 0 to 20 percent slopes (20%)	Shallow loamy 10-14" PZ
		*Shallow clayey 10-14" PZ [2]
68	Cadoma-Epsie complex, 3 to 45 percent slopes	
	Cadoma silty clay loam, 3 to 20 percent slopes (50%)	Saline upland 10-14" PZ
	Epsie silty clay, 3 to 45 percent slopes (25%)	Saline upland 10-14" PZ
69	Kim loam, 0 to 10 percent slopes	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
70	Cadoma silty clay loam, 1 to 15 percent slopes	Saline upland 10-14" PZ

Map Symbol	Map Unit (with components and their proportions)	Range Site
71	Cadoma-Shingle complex, 3 to 45 percent slopes	
	Cadoma silty clay loam, 3 to 20 percent slopes (60%)	Saline upland 10-14" PZ
	Shingle loam, 3 to 45 percent slopes (25%)	Shallow loamy 10-14" PZ
72	Absted-Arvada complex, 0 to 10 percent slopes	
	Absted loam, 0 to 10 percent slopes (40%)	Loamy 10-14" PZ
	Arvada fine sandy loam, 0 to 10 percent slopes (35%)	Saline upland 10-14" PZ
73	Absted-Stoneham-Ulm loams, 3 to 10 percent slopes	
	Absted loam, 3 to 10 percent slopes (40%)	Loamy 10-14" PZ
	Stoneham loam, 3 to 10 percent slopes (30%)	Loamy 10-14" PZ
	Ulm loam, 3 to 10 percent slopes (20%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
74	Petrie-Ulm complex, 0 to 10 percent slopes	
	Petrie silty clay loam, 0 to 10 percent slopes (45%)	Saline upland 10-14" PZ
	Ulm loam, 0 to 10 percent slopes (30%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
75	Arvada-Kim alkali complex, 0 to 10 percent slopes	
	Arvada fine sandy loam, 0 to 10 percent slopes (40%)	Saline upland 10-14" PZ
	Kim loam alkali, 0 to 10 percent slopes (35%)	Saline lowland 10-14" PZ
93	Vona-Olney sandy loams, 0 to 10 percent slopes	
	Vona sandy loam, 0 to 10 percent slopes (50%)	Sandy 10-14" PZ
	Olney sandy loam, 0 to 10 percent slopes (30%)	Sandy 10-14" PZ
102	Rock outcrop, very steep	None
109	Epsie-Rock outcrop complex, 3 to 60 percent slopes	
	Epsie silty clay, 3 to 45 percent slopes (45%)	Saline upland 10-14" PZ
	Rock outcrop (40%)	None
110	Shingle-Tassel complex, 3 to 45 percent slopes	
	Shingle loam, 3 to 45 percent slopes (50%)	Shallow loamy 10-14" PZ
	Tassel sandy loam, 3 to 45 percent slopes (35%)	Shallow sandy 10-14" PZ
111	Rock outcrop-Shingle-Tassel complex, 3 to 60 percent slopes	
	Rock outcrop (30%)	None
	Shingle loam, 3 to 45 percent slopes (25%)	Shallow loamy 10-14" PZ
	Tassel sandy loam, 3 to 45 percent slopes (25%)	Shallow sandy 10-14" PZ

Map Symbol	Map Unit (with components and their proportions)	Range Site
112	Oceanet-Persayo-Rock outcrop complex, 3 to 60 percent slopes	
	Oceanet sandy loam, 3 to 40 percent slopes (25%)	Shallow sandy 5-9" PZ
	Persayo clay loam, 3 to 45 percent slopes (25%)	Saline upland 5-9" PZ
		*Shallow loamy 5-9" PZ [3]
	Rock outcrop (25%)	None
190	Epsie-Shingle complex, 6 to 45 percent slopes	
	Epsie silty clay, 6 to 45 percent slopes (45%)	Saline upland 10-14" PZ
	Shingle loam, 6 to 45 percent slopes (30%)	Shallow loamy 10-14" PZ
192	Cadoma-Shingle-Rock outcrop complex, 3 to 60 percent slopes	
	Cadoma silty clay loam, 3 to 20 percent slopes (30%)	Saline upland 10-14" PZ
	Shingle loam, 3 to 60 percent slopes (25%)	Shallow loamy 10-14" PZ
	Rock outcrop (20%)	None
243	Kim alkali-Kim loams, 0 to 6 percent slopes	
	Kim alkali loam, 0 to 6 percent slopes (50%)	Saline lowland 10-14" PZ
	Kim loam, 0 to 6 percent slopes (30%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
244	Kim alkali loam, 0 to 6 percent slopes	Saline lowland 10-14" PZ
245	Orella silty clay, 0 to 15 percent slopes	Saline upland 10-14" PZ
246	Orella-Epsie-Rock outcrop complex, 0 to 45 percent slopes	
	Orella silty clay, 0 to 25 percent slopes (45%)	Saline upland 10-14" PZ
	Epsie silty clay, 0 to 25 percent slopes (25%)	Saline upland 10-14" PZ
	Rock outcrop (20%)	None
247	Torriorthents, severely eroded, 0 to 15 percent slopes	None assigned
315	Persayo-Clifterson complex, 3 to 45 percent slopes	
	Persayo gravelly clay loam, 15 to 45 percent slopes (50%)	Saline upland 5-9" PZ
		*Shallow loamy 5-9" PZ [3]
	Clifterson very gravelly loam, 3 to 20 percent slopes (30%)	Gravelly 5-9" PZ
322	Nihill-Shingle gravelly loams, 3 to 45 percent slopes	
	Nihill gravelly loam, 3 to 30 percent slopes (45%)	Gravelly 10-14" PZ
	Shingle gravelly loam, 0 to 45 percent slopes (30%)	Shallow loamy 10-14" PZ
323	Nihill cobbly loam, 3 to 45 percent slopes	Gravelly 10-14" PZ

Map Symbol	Map Unit (with components and their proportions)	Range Site
324	Larimer-Nihill complex, 3 to 45 percent slopes	
	Larimer loam, 3 to 15 percent slopes (40%)	Loamy 10-14" PZ
	Nihill gravelly loam, 3 to 45 percent slopes (40%)	Gravelly 10-14" PZ
325	Larimer-Stoneham-Nihill complex, 3 to 30 percent slopes	
	Larimer loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ
	Stoneham loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ
	Nihill gravelly loam, 3 to 30 percent slopes (20%)	Gravelly 10-14" PZ
345	Vona-Otero sandy loams, 3 to 15 percent slopes	
	Vona sandy loam, 3 to 12 percent slopes (45%)	Sandy 10-14" PZ
	Otero sandy loam, 3 to 15 percent slopes (35%)	Sandy 10-14" PZ
346	Nelson-Terry-Otero complex, 3 to 20 percent slopes	
	Nelson fine sandy loam, 3 to 12 percent slopes (30%)	Sandy 10-14" PZ
	Terry sandy loam, 3 to 20 percent slopes (30%)	Sandy 10-14" PZ
	Otero sandy loam, 3 to 15 percent slopes (20%)	Sandy 10-14" PZ
360	Stoneham-Kim association, nearly level and gently sloping	
	Stoneham loam, 2 to 8 percent slopes (50%)	Loamy 10-14" PZ
	Kim loam, 0 to 3 percent slopes (30%)	*Clayey 10-14" PZ [1]
371	Pavillion-Persayo complex, 3 to 45 percent slopes	
	Pavillion loam, 3 to 20 percent slopes (40%)	Loamy 5-9" PZ
	Persayo clay loam, 3 to 45 percent slopes (35%)	Saline upland 5-9" PZ
372	Tassel-Nelson sandy loams, 3 to 45 percent slopes	
	Tassel sandy loam, 3 to 45 percent slopes (50%)	Shallow sandy 10-14" PZ
	Nelson sandy loam, 3 to 12 percent slopes (25%)	Sandy 10-14" PZ
373	Neville-Tensleep association, gently sloping and sloping	
	Neville very fine sandy loam, 2 to 10 percent slopes (45%)	Loamy 10-14" PZ
	Tensleep very fine sandy loam, 2 to 10 percent slopes (35%)	Loamy 10-14" PZ
375	Bowbac-Olney-Arvada complex, 0 to 15 percent slopes	
	Bowbac fine sandy loam, 0 to 15 percent slopes (30%)	Sandy 10-14" PZ
	Olney sandy loam, 0 to 10 percent slopes (25%)	Sandy 10-14" PZ
	Arvada loam, 0 to 10 percent slopes (25%)	Saline upland 10-14" PZ

Map Symbol	Map Unit (with components and their proportions)	Range Site
382	Rock outcrop-Tassel complex, 3 to 60 percent slopes	
	Rock outcrop (40%)	None
	Tassel sandy loam, 3 to 45 percent slopes (40%)	Shallow sandy 10-14" PZ
383	Rock outcrop-Tassel-Nelson complex, 3 to 60 percent slopes	
	Rock outcrop (30%)	None
	Tassel sandy loam, 3 to 45 percent slopes (30%)	Shallow sandy 10-14" PZ
	Nelson sandy loam, 3 to 12 percent slopes (20%)	Sandy 10-14" PZ
389	Spearfish-Neville association, gently sloping and steep	
	Spearfish very fine sandy loam, 15 to 40 percent slopes (50%)	Shallow loamy 10-14" PZ
	Neville very fine sandy loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ
393	Olney-Bowbac fine sandy loams, 3 to 15 percent slopes	
	Olney fine sandy loam, 3 to 10 percent slopes (45%)	Sandy 10-14" PZ
	Bowbac fine sandy loam, 3 to 15 percent slopes (35%)	Sandy 10-14" PZ
394	Saddle-Oceanet fine sandy loams, 0 to 15 percent slopes	
	Saddle fine sandy loam, 0 to 15 percent slopes (60%)	Sandy 5-9" PZ
	Oceanet fine sandy loam, 0 to 15 percent slopes (20%)	Shallow sandy 5-9" PZ
398	Tassel-Bowbac-Terry complex, 3 to 30 percent slopes	
	Tassel sandy loam, 3 to 30 percent slopes (30%)	Shallow sandy 10-14" PZ
	Bowbac fine sandy loam, 3 to 20 percent slopes (25%)	Sandy 10-14" PZ
	Terry fine sandy loam, 3 to 20 percent slopes (25%)	Sandy 10-14" PZ
410	Bondman-Worfka-Worf complex, 0 to 15 percent slopes	
	Bondman fine sandy loam, 0 to 15 percent slopes (30%)	Shallow sandy 10-14" PZ
		*Sandy 10-14" PZ [4]
	Worfka loam, 0 to 15 percent slopes (25%)	Shallow loamy 10-14" PZ
		*Shallow clayey 10-14" PZ [2]
	Worf loam, 0 to 15 percent slopes (25%)	Shallow loamy 10-14" PZ
411	Bondman-Rock outcrop-Worf complex, 3 to 45 percent slopes	
	Bondman fine sandy loam, 3 to 15 percent slopes (35%)	Shallow sandy 10-14" PZ
		*Sandy 10-14" PZ [4]
	Rock outcrop (25%)	None
	Worf loam, 3 to 15 percent slopes (20%)	Shallow loamy 10-14" PZ
426	Larim-Larimer complex, 3 to 15 percent slopes	
	Larim gravelly loam, 3 to 15 percent slopes (50%)	Gravelly 10-14" PZ
	Larimer loam, 3 to 15 percent slopes (40%)	Loamy 10-14" PZ

Map Symbol	Map Unit (with components ant their proportions)	Range Site
445	Rekop-Gystrum loams, 3 to 60 percent slopes	
	Rekop loam, 3 to 60 percent slopes (45%)	Shallow loamy 10-14" PZ
	Gystrum loam, 3 to 30 percent slopes (35%)	Loamy 10-14" PZ
446	Rock outcrop-Travessilla-Spearfish complex, 3 to 60 percent slopes	
	Rock outcrop (35%)	None
	Travessilla stony loam, thick solum, 3 to 60 percent slopes (25%)	Shallow loamy 10-14" PZ
	Spearfish very fine sandy loam, 3 to 40 percent slopes (20%)	Shallow loamy 10-14" PZ
447	Travessilla stony loam, thick solum, 3 to 45 percent slopes	Shallow loamy 10-14" PZ
448	Torrifluvents saline, 0 to 6 percent slopes	None assigned
449	Travessilla-Rock outcrop complex, 6 to 60 percent slopes	
	Travessilla stony loam, 6 to 60 percent slopes (45%)	Very shallow 10-14" PZ
	Rock outcrop (40%)	None
450	Torrifluvents-Fluvaquents complex, 0 to 6 percent slopes	
	Torrifluvents, 0 to 6 percent slopes (40%)	None assigned
	Fluvaquents, 0 to 3 percent slopes (40%)	None assigned
490	Shingle-Thedalund loams, 3 to 45 percent slopes	
	Shingle loam, 3 to 45 percent slopes (40%)	Shallow loamy 10-14" PZ
	Thedalund loam, 3 to 30 percent slopes (35%)	Loamy 10-14" PZ
546	Spearfish-Rock outcrop-Neville complex, 3 to 60 percent slopes	
	Spearfish very fine sandy loam, 3 to 40 percent slopes (35%)	Shallow loamy 10-14" PZ
	Rock outcrop (30%)	None
	Neville very fine sandy loam, 3 to 15 percent slopes (20%)	Loamy 10-14" PZ
572	Worland-Oceanet sandy loams, 3 to 15 percent slopes	
	Worland sandy loam, 3 to 15 percent slopes (50%)	Sandy 5-9" PZ
	Oceanet sandy loam, 3 to 15 percent slopes (25%)	Shallow sandy 5-9" PZ
590	Shingle-Rock outcrop complex, 3 to 60 percent slopes	
	Shingle loam, 3 to 60 percent slopes (50%)	Shallow loamy 10-14" PZ
	Rock outcrop (30%)	None
601	Youngston-Uffens-Glenton complex, 0 to 6 percent slopes	
	Youngston loam, 0 to 6 percent slopes (35%)	Loamy 5-9" PZ
	Uffens very fine sandy loam, 0 to 6 percent slopes (30%)	Saline upland 5-9" PZ
	Glenton loam, 0 to 6 percent slopes (20%)	Loamy 5-9" PZ

Map Symbol	Map Unit (with components and their proportions)	Range Site
602	Binton-Uffens complex, 0 to 6 percent slopes	
	Binton loam, 0 to 6 percent slopes (50%)	Saline upland 5-9" PZ
	Uffens very fine sandy loam, 0 to 6 percent slopes (30%)	Saline upland 5-9" PZ
604	Effington-Effington Variant complex, 0 to 10 percent slopes	
	Effington silt loam, 0 to 6 percent slopes (50%)	Saline upland 5-9" PZ
	Effington Variant silty clay loam, 0 to 10 percent slopes (30%)	Saline upland 5-9" PZ
606	Hoot-Rock outcrop complex, 3 to 60 percent slopes	
	Hoot channery loam, 3 to 60 percent slopes (40%)	Shallow loamy 10-14" PZ
	Rock outcrop (35%)	None
645	Mudray-Persayo-Effington Variant complex, 3 to 30 percent slopes	
	Mudray very fine sandy loam, 3 to 15 percent slopes (40%)	Saline upland 5-9" PZ
	Persayo clay loam, 3 to 30 percent slopes (25%)	Shale 5-9" PZ
	Effington Variant silty clay loam, 3 to 10 percent slopes (15%)	Saline upland 5-9" PZ
650	Mudray clay loam, 0 to 15 percent slopes	Saline upland 5-9" PZ
671	Rock outcrop-Persayo complex, 3 to 60 percent slopes	
	Rock outcrop (50%)	None
	Persayo clay loam, 3 to 45 percent slopes (35%)	Shale 5-9" PZ
675	Pavillion-Youngston loams, 0 to 15 percent slopes	
	Pavillion loam, 2 to 15 percent slopes (40%)	Loamy 5-9" PZ
	Youngston loam, 0 to 10 percent slopes (35%)	Loamy 5-9" PZ
700	Stoneham-Cushman loams, 3 to 15 percent slopes	
	Stoneham loam, 3 to 15 percent slopes (50%)	Loamy 10-14" PZ
	Cushman loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ
701	Fort Collins-Kim loams, 3 to 15 percent slopes	
	Fort Collins loam, 3 to 15 percent slopes (50%)	Loamy 10-14" PZ *Clayey 10-14" PZ [1]
	Kim loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ *Clayey 10-14" PZ [1]
702	Absted-Fort Collins loams, 3 to 15 percent slopes	
	Absted loam, 3 to 10 percent slopes (45%)	Loamy 10-14" PZ *Clayey 10-14" PZ [1]
	Fort Collins loam, 3 to 15 percent slopes (35%)	Loamy 10-14" PZ *Clayey 10-14" PZ [1]

Map Symbol	Map Unit (with components and their proportions)	Range Site
703	Fort Collins-Cushman loams, 3 to 15 percent slopes	
	Fort Collins loam, 3 to 15 percent slopes (50%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
	Cushman loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
705	Kim-Thedalund loams, 3 to 15 percent slopes	
	Kim loam, 3 to 15 percent slopes (50%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
	Thedalund loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ
706	Cushman-Terry-Worf complex, 3 to 20 percent slopes	
	Cushman loam, 3 to 20 percent slopes (35%)	Loamy 10-14" PZ
	Terry sandy loam, 3 to 20 percent slopes (25%)	Sandy 10-14" PZ
	Worf loam, 3 to 20 percent slopes (20%)	Shallow loamy 10-14" PZ
708	Renohill-Cushman-Worfka complex, 3 to 20 percent slopes	
	Renohill clay loam, 3 to 20 percent slopes (40%)	Clayey 10-14" PZ
		*Loamy 10-14" PZ [5]
	Cushman loam, 3 to 20 percent slopes (20%)	Loamy 10-14" PZ
	Worfka loam, 3 to 20 percent slopes (20%)	Shallow loamy 10-14" PZ
		*Shallow clayey 10-14" PZ [2]
709	Renohill-Cadoma-Worfka complex, 0 to 20 percent slopes	
	Renohill clay loam, 0 to 20 percent slopes (40%)	Clayey 10-14" PZ
		*Loamy 10-14" PZ [5]
	Cadoma silty clay loam, 0 to 20 percent slopes (25%)	Saline upland 10-14" PZ
	Worfka loam, 0 to 20 percent slopes (20%)	Shallow loamy 10-14" PZ
		*Shallow clayey 10-14" PZ [2]
710	Cadoma-Renohill-Ulm complex, 3 to 20 percent slopes	
	Cadoma silty clay loam, 3 to 20 percent slopes (40%)	Saline upland 10-14" PZ
	Renohill clay loam, 3 to 20 percent slopes (25%)	Clayey 10-14" PZ
		*Loamy 10-14" PZ [5]
	Ulm loam, 3 to 10 percent slopes (20%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
720	Blazon-Rock outcrop complex, 3 to 60 percent slopes	
	Blazon loam, 3 to 45 percent slopes (45%)	Shallow loamy 10-14" PZ
	Rock outcrop (30%)	None

Map Symbol	Map Unit (with components and their proportions)	Range Site
722	Blazon loam, 3 to 45 percent slopes	Shallow loamy 10-14" PZ
723	Blazon-Delphill loams, 3 to 30 percent slopes	
	Blazon loam, 3 to 30 percent slopes (40%)	Shallow loamy 10-14" PZ
	Delphill loam, 3 to 15 percent slopes (35%)	Loamy 10-14" PZ
		*Clayey 10-14" PZ [1]
724	Blazon-Brownsto complex, 3 to 45 percent slopes	
	Blazon loam, 3 to 45 percent slopes (40%)	Shallow loamy 10-14" PZ
	Brownsto gravelly loam, 3 to 30 percent slopes (35%)	Shallow loamy 10-14" PZ
725	Blazon-Diamondville loams, 3 to 30 percent slopes	
	Blazon loam, 3 to 30 percent slopes (40%)	Shallow loamy 10-14" PZ
	Diamondville loam, 3 to 20 percent slopes (35%)	Loamy 10-14" PZ
730	Forelle-Diamondville loams, 3 to 15 percent slopes	
	Forelle loam, 3 to 15 percent slopes (45%)	Loamy 10-14" PZ
	Diamondville loam, 3 to 15 percent slopes (35%)	Loamy 10-14" PZ
732	Thermopolis-Rock outcrop complex, 3 to 45 percent slopes	
	Thermopolis loam, 3 to 45 percent slopes (40%)	Shallow loamy 10-14" PZ
	Rock outcrop (35%)	None
735	Patent-Forelle association, gently sloping and sloping	
	Patent loam, 3 to 15 percent slopes (45%)	Loamy 10-14" PZ
	Forelle loam, 3 to 15 percent slopes (35%)	Loamy 10-14" PZ
736	Forelle-Pinelli loams, 3 to 15 percent slopes	
	Forelle loam, 3 to 15 percent slopes (50%)	Loamy 10-14" PZ
	Pinelli loam, 3 to 15 percent slopes (30%)	Loamy 10-14" PZ
737	Forelle-Alcova loams, 3 to 15 percent slopes	
	Forelle loam, 3 to 15 percent slopes (40%)	Loamy 10-14" PZ
	Alcova loam, 3 to 15 percent slopes (35%)	Loamy 10-14" PZ
		*Sandy 10-14" PZ [6]
749	Renohill-Worfka complex, 0 to 20 percent slopes	
	Renohill clay loam, 0 to 20 percent slopes (45%)	Clayey 10-14" PZ
		*Loamy 10-14" PZ [5]
	Worfka loam, 0 to 20 percent slopes (35%)	Shallow loamy 10-14" PZ
		*Shallow clayey 10-14" PZ [2]

Map Symbol	Map Unit (with components and their proportions)	Range Site
750	Worfka-Cushman association, gently sloping and steep	
	Worfka loam, 3 to 20 percent slopes (50%)	Shallow loamy 10-14" PZ
		*Shallow clayey 10-14" PZ [2]
	Cushman loam, 3 to 20 percent slopes (30%)	Loamy 10-14" PZ
751	Worfka-Shingle-Rock outcrop complex, 3 to 45 percent slopes	
	Worfka loam, 3 to 20 percent slopes (45%)	Shallow loamy 10-14" PZ
		*Shallow clayey 10-14" PZ [2]
	Shingle loam, 3 to 45 percent slopes (20%)	Shallow loamy 10-14" PZ
	Rock outcrop (15%)	None
752	Epsie silty clay, 3 to 15 percent slopes	Saline upland 10-14" PZ
753	Gaynor-Samsil clays, 3 to 15 percent slopes	
	Gaynor clay, 3 to 15 percent slopes (40%)	Clayey 10-14" PZ
	Samsil clay, 3 to 15 percent slopes (40%)	Shallow clayey 10-14" PZ
802	Rock outcrop-Starman complex, 6 to 60 percent slopes	
	Rock outcrop (50%)	None
	Starman gravelly loam, 6 to 60 percent slopes (40%)	Very shallow 15-19" PZ
804	Rock outcrop-Merino complex, 6 to 60 percent slopes	
	Rock outcrop (45%)	None
	Merino gravelly sandy clay loam, 6 to 60 percent slopes (35%)	Shallow loamy 15-19" PZ
		*Shallow clayey 15-19" PZ [7]
806	Starley-Starman-Rock outcrop complex, 6 to 60 percent slopes	
	Starley loam, 6 to 40 percent slopes (50%)	Shallow loamy 15-19" PZ
	Starman gravelly loam, 6 to 60 percent slopes (20%)	Very shallow 15-19" PZ
	Rock outcrop (15%)	None
808	Nielsen-Nielsen Variant-Rock outcrop complex, 6 to 60 percent slopes	
	Nielsen channery loam, 6 to 60 percent slopes (30%)	Shallow loamy 15-19" PZ
	Nielsen Variant clay loam, 6 to 60 percent slopes (25%)	Shallow clayey 15-19" PZ
	Rock outcrop (20%)	None
810	Gilispie-Bachus-Nielsen complex, 3 to 60 percent slopes	
	Gilispie cobbly loam, 6 to 55 percent slopes (40%)	Shallow loamy 15-19" PZ
		*Woodland [8]
	Bachus loam, 3 to 20 percent slopes (20%)	Loamy 15-19" PZ
	Nielsen channery loam, 6 to 60 percent slopes (20%)	Shallow loamy 15-19"PZ

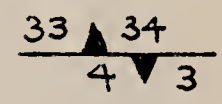
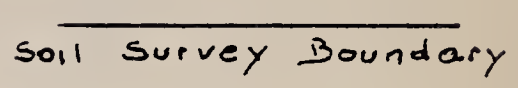
Map Symbol	Map Unit (with components and their proportions)	Range Site
812	Bachus-Mayoworth complex, 3 to 45 percent slopes	
	Bachus loam, 3 to 20 percent slopes (50%)	Loamy 15-19" PZ
	Mayoworth clay loam, 3 to 45 percent slopes (30%)	Clayey 15-19" PZ
813	Cryoborolls-Cryorthents complex, 10 to 60 percent slopes	
	Cryoborolls, 10 to 60 percent slopes (70%)	None assigned
	Cryorthents, 10 to 60 percent slopes (30%)	None assigned
814	Mayoworth-Burnette-Nielsen Variant complex, 3 to 45 percent slopes	
	Mayoworth clay loam, 3 to 45 percent slopes (35%)	Clayey 15-19" PZ
	Burnette loam, 3 to 30 percent slopes (25%)	Loamy 15-19" PZ
	Nielsen Variant clay loam, 3 to 45 percent slopes (20%)	Shallow clayey 15-19" PZ
815	Bridger-Nielsen Variant complex, 3 to 30 percent slopes	
	Bridger cobbly clay loam, 3 to 30 percent slopes (70%)	Clayey 15-19" PZ
		*Loamy 15-19" PZ [9]
	Nielsen Variant clay loam, 3 to 30 percent slopes (15%)	Shallow clayey 15-19" PZ
816	Nielsen-Millerlake complex, 3 to 45 percent slopes	
	Nielsen channery loam, 3 to 45 percent slopes (60%)	Shallow loamy 15-19" PZ
	Millerlake loam, 3 to 20 percent slopes (20%)	Loamy 15-19" PZ
818	Nielsen-Gilispie complex, 3 to 45 percent slopes	
	Nielsen channery loam, 3 to 45 percent slopes (55%)	Shallow loamy 15-19" PZ
	Gilispie cobbly loam, 3 to 45 percent slopes (25%)	Shallow loamy 15-19" PZ
		*Woodland [8]
820	Bachus-Wix complex, 3 to 45 percent slopes	
	Bachus loam, 3 to 20 percent slopes (40%)	Loamy 15-19" PZ
	Wix very fine sandy loam, 3 to 45 percent slopes (40%)	Woodland
822	Starley-Bachus-Starman complex, 6 to 60 percent slopes	
	Starley loam, 6 to 40 percent slopes (45%)	Shallow loamy 15-19" PZ
	Bachus loam, 6 to 20 percent slopes (20%)	Loamy 15-19" PZ
	Starman gravelly loam, 6 to 60 percent slopes (20%)	Very shallow 15-19" PZ
850	Millerlake-Adel loams, 3 to 30 percent slopes	
	Millerlake loam, 3 to 30 percent slopes (50%)	Loamy 15-19" PZ
	Adel loam, 3 to 30 percent slopes (25%)	Loamy 15-19" PZ
854	Burnette-Millerlake loams, 3 to 30 percent slopes	
	Burnette loam, 3 to 30 percent slopes (50%)	Loamy 15-19" PZ
	Millerlake loam, 3 to 30 percent slopes (35%)	Loamy 15-19" PZ

Map Symbol	Map Unit (with components and their proportions)	Range Site
870	Wix-Judkins complex, 6 to 60 percent slopes	
	Wix very fine sandy loam, 6 to 45 percent slopes (50%)	Woodland
	Judkins stony silt loam, 15 to 60 percent slopes (25%)	Woodland
872	Burnette-Nielsen Variant-Rock outcrop complex, 3 to 45 percent slopes	
	Burnette loam, 3 to 30 percent slopes (30%)	Loamy 15-19" PZ
	Nielsen Variant clay loam, 3 to 45 percent slopes (25%)	Shallow clayey 15-19" PZ
	Rock outcrop (20%)	None
876	Wetterhorn-Wetterhorn Variant complex, 6 to 60 percent slopes	
	Wetterhorn stony loam, 6 to 60 percent slopes (40%)	Woodland
	Wetterhorn Variant very stony loam, 6 to 60 percent slopes (40%)	Woodland
902	Samsil-Shingle-Rock outcrop complex, 3 to 45 percent slopes	
	Samsil clay, 3 to 45 percent slopes (50%)	Shallow clayey 10-14" PZ
	Shingle loam, 3 to 45 percent slopes (20%)	Shallow loamy 10-14" PZ
	Rock outcrop (15%)	None

*Range site on this soil in some areas of this unit.

[1]The clay loam phase included in mapping covelates to the Clayey 10-14" PZ range site.
[2]The clay loam phase included in mapping covelates to the Shallow clayey 10-14" PZ range site.
[3]The nonalkali phase included in mapping covelates to the Shallow loamy 5-9" PZ range site.
[4]Moderately deep soils included in mapping covelate to the Sandy 10-14" PZ range site.
[5]The loam phase included in mapping covelates to the Loamy 10-14" PZ range site.
[6]The sandy loam phase included in mapping covelates to the Sandy 10-14" PZ range site.
[7]The gravelly clay loam phase included in mapping covelates to the Shallow clayey 15-19" PZ range site.
[8]The moist phase included in mapping supports woodland vegetation and is not covelated to a range site.
[9]The cobbly loam phase included in mapping covelates to the Loamy 15-19" PZ range site.

Table 3. Map symbols.

Mapping unit delineation and soil map symbol	
Section corners	
Match lines (Green line)	
Survey area boundary	
Civil boundaries	
Streams	
Paved highway	
Secondary road	

MAP UNIT DESCRIPTIONS

The 111 map units are described in this section. The descriptions are in numerical order. Map units in the coldest parts have symbols beginning with 8. The identification legend, Table 2, lists the map symbols, map unit names, the components of complexes and associations and their proportions, and range sites. Soil interpretations for the components of these soil map units are presented in the section on Use and Management of Soils.

The soils vary on the landscape in patterns too intricate to be represented perfectly on a soil map. The soil map units as described here and as delineated on the map reduce the complications of nature to a manageable level and present a useful approximation of reality. The map units have one, two, or three major components plus smaller amounts of other soils that are included because they are too intricately intermingled to be delineated separately. The names and descriptions of the map units indicate which are consociations with one major component and which are complexes or associations with two or three components. The estimated proportions of the major components and of the most prominent inclusions are listed individually. For some map units, an additional estimate is given for included small areas of the less prominent inclusions.

11--Larimer loam, 0 to 8 percent slopes. This very deep, well drained soil is on nearly level to gently sloping high terraces and fans. It formed in loamy alluvial sediments that overlie sand and gravel of mixed origin. Pebbles and cobbles are well rounded and are mostly quartzite and igneous. Slopes are generally smooth to slightly undulating and only slightly irregular. The native vegetation is mainly big sagebrush, bluebunch wheatgrass, Sandberg bluegrass, and bluegrama. Elevation is 4400 to 6200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 55 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is light brownish gray brown loam about 2 inches thick. The subsoil is pale brown clay loam about 8 inches thick. The substratum is light gray strongly calcareous loam about 10 inches thick. The underlying material to a depth of 60 inches is very gravelly sand. Depth to very gravelly or very cobbly sand ranges from 20 to 40 inches.

Included in this unit is about 14 percent Larim gravelly loam or sandy loam on slightly convex land forms and 6 percent Nihill gravelly loam on the crest of ridge tops and shoulders of drainageways. Included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Larimer loam soil is moderate. Available water capacity is about 3 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is low to moderate. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife. Some areas are being irrigated for hay production.

The potential plant community on this unit is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

11L--Larimer sandy loam, 0 to 8 percent slopes. This very deep, well drained soil is on nearly level to gently sloping terraces and fans. It formed in loamy alluvial sediments that overlie sand and gravel of mixed origin. The pebbles and cobbles are well rounded and are mostly quartzite and igneous. Slopes are generally smooth to slightly undulating. The native vegetation is mainly big sagebrush, bluebunch wheatgrass, Sandberg bluegrass, bluegrama, and needleandthread. Elevation is 4400 to 6200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 55 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is light brownish gray to pale brown sandy loam about 6 inches thick. The subsoil is light brown sandy clay loam about 14 inches thick. The substratum is calcareous light brown gravelly sandy loam about 10 inches thick. The underlying material to a depth of 60 inches is very gravelly sand. Depth to the underlying gravelly sand ranges from 20 to 40 inches.

Included in this unit is about 12 percent Nihill gravelly loam on the shoulders and slopes at the outer border of the deleniations.

Permeability of this Larimer sandy loam soil is moderate. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife. Some areas are being irrigated for hay production.

The potential plant community on this unit is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

11T--Garland-Preatorson complex, 0 to 10 percent slopes. This map unit is on upland terraces adjacent to major streams. Slopes are generally smooth to gently undulating with steeper slopes occuring near terrace breaks. The native vegetation is mainly big sagebrush, bluegrama, bluebunch wheatgrass, pricklypear, and Sandberg bluegrass. Elevation is 4800 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 65 percent Garland loam, on smooth terrace surfaces, and 25 percent Preatorson very gravelly loam, on ridges and shoulders of terrace breaks. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Clifterson very gravelly loam on the shoulders of terrace breaks. The percentage varies from one area to another.

The Garland loam soil is moderately deep to gravel and well drained. It formed in loamy alluvial sediments that overlie sand and gravel derived dominantly from mixed sources, both sedimentary and igneous. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is brown light clay loam about 18 inches thick. The substratum is very pale brown calcareous gravelly sandy clay loam about 9 inches thick over very gravelly loamy sand. Depth to sand and gravel ranges from 20 to 40 inches.

Permeability of the Garland loam soil is moderate. Available water capacity is about 3 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is low to moderate. The hazard of soil blowing is low.

The Preatorson very gravelly loam soil is shallow to sand and gravel and well drained. It formed in gravelly and cobbly loamy alluvium derived dominantly from mixed sedimentary and igneous rocks. Typically, the surface layer is light brownish gray very gravelly loam about 3 inches thick. The subsoil is grayish brown to light gray very gravelly sandy clay loam about 7 inches thick. The substratum is light gray and light brownish gray calcareous very gravelly sand to a depth of 60 inches. Depth to loose sand and gravel ranges from 10 to 20 inches.

Permeability of the Preatorson very gravelly loam soil is moderate through the subsoil, and rapid below. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is slow, and the hazard of water erosion is low to moderate. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife. Locally some areas may be used for hay production under irrigation.

The potential plant community on the Garland soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and big sagebrush. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre. The potential plant community on the Preatorson soils is mainly bluebunch wheatgrass, needleandthread, and big sagebrush. The average annual production of air-dry vegetation ranges from 100 to 300 pounds per acre.

45--Youngston-Glenton loams, 0 to 6 percent slopes. This map unit is on alluvial fans and drainageways. Slopes are smooth in most areas with some vertical cuts along drainages. The native vegetation is mainly big sagebrush, bluebunch wheatgrass, bluegrama, and prairie junegrass. Elevation is 4300 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Youngston loam, on fans and bottomland, and 25 percent Glenton loam, on bottoms along drainages. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Uffens very fine sandy loam on upper fans and footslopes, 10 percent Pavillion loam on truncated footslopes, and 5 percent Effington silty clay loam on fans below shale outcrops. The percentage varies from one area to another.

The Youngston loam soil is very deep and well drained. It formed in loamy alluvial sediments derived dominantly from sandstone and silty shale. Typically, the surface layer is very pale brown to pale brown loam about 11 inches thick. The subsoil is very pale brown stratified loam, silt loam, and fine sandy loam to a depth of 60 inches.

Permeability of the Youngston loam soil is moderately slow. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Glenton loam soil is very deep and well drained. It formed in stratified loamy alluvial sediments derived dominantly from sandstone and silty shale. Typically, the surface layer is pale brown loam about 4 inches thick. The subsoil is light brownish gray and pale brown stratified sandy loam, fine sandy loam, and silt loam to a depth of 60 inches or more thick.

Permeability of the Glenton loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife. Locally some areas are being irrigated for hay production.

The potential plant community on the Youngston and Glenton soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and big sagebrush. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre.

46--Petrie-Kim alkali complex, 0 to 10 percent slopes. This map unit is on narrow drainageways and on toeslopes of the adjacent uplands. Slopes are generally smooth. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, bottlebrush squirreltail, Indian ricegrass, blue-grama, and some big sagebrush and greasewood. Elevation is 4400 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 45 percent Petrie silty clay loam, on toeslopes and drainageways, and 30 percent Kim alkali loam, along drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 8 percent Cadoma silty clay loam and silt loam on toeslopes and fans below shale uplands, 5 percent Epsie silty clay loam and silty clay on slightly convex positions along ridge crests, and 2 percent Kim silt loam and loam on narrow drainageways and fans. Also included are small areas of Thedalund, Cushman, Renohill, and Shingle soils. These included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Petrie silty clay loam soil is deep and well drained. It formed in calcareous, saline fine-textured alluvium derived dominantly from saline shale high in gypsum. Typically, the surface layer is light brownish gray silty clay loam about 7 inches thick. The subsoil is grayish brown silty clay to a depth of 60 inches. The soil is strongly or very strongly alkaline.

Permeability of the Petrie silty clay loam soil is slow to very slow. Available water capacity is about 7 to 11 inches. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Kim alkali loam soil is deep and moderately well drained. It formed in loamy alluvial sediments that are both saline and alkaline derived dominantly from mixed shale and sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray loam, with lenses of sandy loam and silt loam, about 60 inches thick. The soil is strongly alkaline.

Permeability of the Kim alkali loam soil is moderately slow to slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Petrie soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Kim alkali soils is mainly alkali sacaton, basin wildrye, and greasewood. The average annual production of air-dry vegetation ranges from 600 to 1200 pounds per acre.

47--Petrie-Cadoma-Epsie complex, 0 to 15 percent slopes. This map unit is on narrow drainageways, footslopes, and gently rolling uplands. Slopes are generally smooth. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, Indian ricegrass, bottlebrush squirreltail, bluegrama, and Sandberg bluegrass. Elevation is 4400 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 55 percent Petrie silty clay loam, in narrow drainageways, 25 percent Cadoma silty clay loam, on sideslopes and fans, and 15 percent Epsie silty clay, on sideslopes and shoulders of uplands. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 3 percent Orella silty clay on crests of knolls and ridge tops and 2 percent shale rock outcrop on ridge tops and eroded breaks.

The Petrie silty clay loam soil is deep and well drained. It formed in calcareous, saline, fine-textured alluvium derived dominantly from saline shale high in gypsum. Typically, the surface layer is light brownish gray sitly clay loam about 6 inches thick. The subsoil is grayish brown to light yellowish brown silty clay about 60 inches thick. The soil is strongly to very strongly alkaline.

Permeability of the Petrie silty clay loam soil is slow to very slow. Available water capacity is about 7 to 11 inches. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Typically, the surface layer is light gray silty clay loam about 4 inches thick. The subsoil is very strongly alkaline pale brown silty clay about 14 inches thick. The substratum is light gray strongly alkaline silty clay, and silty clay loam about 18 inches thick over gypsiferous clay shale. Depth to underlying clay shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Epsie silty clay soil is shallow to clay shale and well drained. It formed in fine-textured residuum derived dominantly from gypsiferous clay shale. Typically, the surface layer is light gray silty clay about 3 inches thick. The subsoil is gray silty clay about 12 inches thick. The substratum is weathered gypsiferous clay shale about 4 inches thick over dark clay shale. Depth to clay shale ranges from 10 to 20 inches. The soil is moderately to strongly alkaline.

47--Continued

Permeability of the Epsie silty clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The soil is subject to piping. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Petrie, Cadoma, and Epsie soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

60--Cadoma-Kim complex, 1 to 10 percent slopes. This map unit is on nearly level to sloping uplands. Slopes are smooth with some undulating ridges and sideslopes. The native vegetation is mainly big sagebrush, bluegrama, bluebunch wheatgrass on the Kim soils and birdfoot sagebrush and gardner saltbush on the Cadoma soils. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 45 percent Cadoma silty clay loam on slightly higher undulating ridges and 45 percent Kim loam on lower smooth slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 3 percent Epsie silty clay on shoulders and crests of low ridges and knolls and 7 percent Kim alkali on concave alluvial fans and drainageways. The percentage varies from one area to another.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Typically, the surface layer is light gray silty clay loam about 4 inches thick. The subsoil is light brownish gray very strongly alkaline silty clay about 14 inches thick. The substratum is light gray strongly alkaline silty clay about 18 inches thick over gypsiferous shale. Depth to underlying clay shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Kim loam soil is deep and well drained. It formed in loess and alluvial sediments derived dominantly from mixed sandstones and silty shales. Typically, the surface layer is light brownish gray loam about 6 inches thick. The subsoil is light brownish gray loam, with lenses of silt loam, to a depth of 60 inches.

Permeability of the Kim loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Locally some areas are being irrigated for hay.

The potential plant community on the Cadoma soil is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community of the Kim soil is bluebunch wheatgrass, thickspike and western wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

67--Cadoma-Worfka complex, 0 to 20 percent slopes. This map unit is on benches and sideslopes of bedrock-controlled uplands. Slopes are smooth to irregular on the gently sloping uplands and irregular on the moderately steep sideslopes into drainages. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, bottlebrush squirreltail, Indian ricegrass, big sagebrush, bluebunch wheatgrass, and halogeton. Elevation is 5000 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 55 percent Cadoma silty clay loam, on sideslopes, short fans, and slightly concave benches, and 20 percent Worfka loam, on ridge tops. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Arvada loam and 5 percent Renohill clay loam on slightly concave slopes, 3 percent Shingle loam on shoulders of ridge crests, and 2 percent Rock outcrop on the steeper side slopes into drainages. Also included are small areas of Worf, Orella, and Epsie soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Typically, the surface layer is very pale brown silty clay loam about 4 inches thick. The subsoil is pale brown very strongly alkaline silty clay about 14 inches thick. The substratum is light gray strongly alkaline silty clay about 18 inches thick over gypsiferous clay shale. Depth to underlying clay shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Worfka loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from interbedded shale and sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown heavy clay loam about 11 inches thick over calcareous sandstone or shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Worfka loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Cadoma soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Worfka soils

67--Continued

is mainly bluebunch wheatgrass, thickspike and western wheatgrass, Indian ricegrass, and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

68--Cadoma-Epsie complex, 3 to 45 percent slopes. This map unit is on undulating to hilly uplands dissected by drainageways. Slopes are generally smooth with some areas broken by rock outcrop. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, Indian ricegrass, bottlebrush squirreltail. Elevation is 4500 to 5800 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Cadoma silty clay loam, on sideslopes and fans, and 25 percent Epsie silty clay, on knolls and hills. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Orella silty clay on knolls and crests of ridge tops, 5 percent Shingle loam on steep broken slopes into drainageways, and 5 percent Rock outcrop on ridge crests and dissected drainageways. Also included are small areas of Petrie, Renohill, and Worfka soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Typically, the surface layer is light gray silty clay loam about 4 inches thick. The subsoil is pale brown very strongly alkaline silty clay loam about 14 inches thick. The substratum is pale brown strongly alkaline silty clay about 18 inches thick over gypsiferous clay shale. Depth to underlying clay shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Epsie silty clay soil is shallow to clay shale and well drained. It formed in fine-textured residuum derived dominantly from gypsiferous clay shale. Typically, the surface layer is light brownish gray silty clay about 3 inches thick. The subsoil is light brownish gray silty clay about 12 inches thick. The substratum is weathered gypsiferous clay shale. Depth to clay shale ranges from 10 to 20 inches. The soil is strongly to very strongly alkaline.

Permeability of the Epsie silty clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The soil is subject to piping. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Cadoma and Epsie soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

69--Kim loam, 0 to 10 percent slopes. This deep and well drained soil is on alluvial fans, terraces, and valley bottoms below escarpments of sedimentary rocks. It formed in loess and alluvial sediments derived dominantly from mixed sandstone and silty shale. Slopes are smooth with some drainage dissection. The native vegetation is mainly big sagebrush, blue-grama, bluebunch wheatgrass, rubber rabbitbrush, and needleandthread. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

Typically, the surface layer is light brownish gray loam about 6 inches thick. The subsoil is light brownish gray loam, with lenses of silt loam, to a depth of 60 inches.

Included in this unit is about 10 percent Stoneham loam on similar landscapes and 5 percent Thedalund loam on slopes adjacent to bedrock controlled areas. Also included are small areas of Otero, Shingle, and Kim alkali soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Kim loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for range, hay, and pasture. Under irrigation, this soil is suited to all climatically adopted crops.

The potential plant community on this unit is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

70--Cadoma silty clay loam, 1 to 15 percent slopes. This moderately deep and well drained soil is on nearly level to sloping uplands. It formed in loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Slopes are smooth. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, bud sagebrush, Indian ricegrass, bottlebrush squirreltail, and bluegrama. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is very pale brown silty clay loam about 4 inches thick. The subsoil is light brownish gray very strongly alkaline silty clay about 14 inches thick. The substratum is light gray silty clay loam about 19 inches thick over gypsiferous shale. Depth to underlying clay shale ranges from 20 to 40 inches.

Included in this unit is about 12 percent Epsie silty clay on shoulders and sideslopes, 5 percent Thedalund loam on footslopes and lower interfluves, 5 percent Shingle loam on shoulders and crests of ridges, 5 percent Kim alkali along the lower portions of drainageways near main channels, and 3 percent Arvada loam on small benches and fans. Included areas make up about 25 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on this unit is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

71--Cadoma-Shingle complex, 3 to 45 percent slopes. This map unit is on uplands and dissected drainageways. Slopes are generally complex. The native vegetation is mainly gardner saltbush, bluebunch wheatgrass, birdfoot sagebrush, Sandberg bluegrass, Indian ricegrass, snakeweed, big sagebrush, and rubber rabbitbrush. Elevation is 4400 to 5800 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 60 percent Cadoma silty clay loam, on sideslopes and fans, and 25 percent Shingle loam, on steep breaks. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Thedalund silt loam on footslopes next to drainages, and 5 percent Orella silty clay on knolls and ridge tops. Also included are small areas of Rock outcrop, Tassel and Kim soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Typically, the surface layer is light gray strongly alkaline silty clay loam about 4 inches thick. The subsoil is light brownish gray very strongly alkaline silty clay about 14 inches thick. The substratum is light gray strongly alkaline silty clay loam about 12 inches thick over gypsiferous clay shale. Depth to shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray loam about 7 inches thick. The underlying material is soft interbedded shale and sandstone. Depth to underlying bedrock ranges from 10 to 20 inches. The bedrock is soft shale and interbedded sandstone.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

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The potential plant community on the Cadoma soil is gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Shingle soil is bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

72--Absted-Arvada complex, 0 to 10 percent slopes. This map unit is on valley bottoms, terraces, and alluvial fans. Slopes are mostly smooth but some areas are irregular. The native vegetation is mainly western wheatgrass, Sandberg bluegrass, bluegrama, and pricklypear on the Absted soil; greasewood and alkali sacaton on the Arvada soil. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Absted loam, on slightly concave slopes, and 35 percent Arvada fine sandy loam, on undulating fans and footslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Fort Collins loam on footslopes and fans, 10 percent Stoneham loam on footslopes and fans, and 5 percent Ulm loam within the uplands. The percentage varies from one area to another.

The Absted loam soil is deep and well drained. It formed in moderately fine-textured alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is light brownish gray heavy clay loam about 17 inches thick. It is strongly to very strongly alkaline in the lower part. The substratum is light brownish gray strongly to very strongly alkaline clay loam to a depth of more than 60 inches.

Permeability of the Absted loam soil is moderately slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Arvada fine sandy loam soil is deep and well drained. It formed in stratified moderately fine-textured alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light gray fine sandy loam about 3 inches thick. The subsoil is pale brown strongly to very strongly alkaline sandy clay about 12 inches thick. The substratum to a depth of 60 inches is light brownish gray strongly alkaline loam and clay loam.

Permeability of the Arvada fine sandy loam soil is very slow. Available water capacity is about 5 to 8 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow in micro depressions and rapid elsewhere, and the hazard of water erosion is high. The hazard of soil blowing is moderate to low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Absted soil is bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre. The potential plant community on the Arvada soil is gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

73--Absted-Stoneham-Ulm loams, 3 to 10 percent slopes. This map unit is on alluvial fans, valley fills, and footslopes. Slopes are smooth to irregular. The native vegetation is mainly big sagebrush, western wheatgrass, Sandberg bluegrass, bluegrama, and pricklypear. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Absted loam, on footslopes, 30 percent Stoneham loam, on fans and valley bottoms, and 20 percent Ulm loam, in slightly concave drainages. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Fort Collins clay loam on footslopes and fans and 5 percent Cushman loam on footslopes of the adjoining uplands. The percentage varies from one area to another.

The Absted loam soil is deep and well drained. It formed in moderately fine-textured alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is light brownish gray to brown heavy clay loam about 17 inches thick. The substratum is pale brown and light brownish gray clay loam to a depth of 60 inches. The lower subsoil and the substratum are strongly to very strongly alkaline.

Permeability of the Absted loam soil is moderately slow to slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Stoneham loam soil is deep and well drained. It formed in loamy alluvial sediments derived dominantly from sandstone and shale. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is light brownish gray light clay loam about 6 inches thick. The substratum is pale brown loam and sandy clay loam to a depth of 50 inches or more.

Permeability of the Stoneham loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches or more. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Ulm loam soil is deep and well drained. It formed in calcareous fine-textured alluvium derived dominantly from interbedded shale and sandstone. Typically, the surface layer is light brownish gray loam about 5 inches thick. The subsoil is grayish brown heavy clay loam to light clay about 9 inches thick. The substratum is light brownish gray calcareous clay loam and sandy clay loam to a depth of 60 inches.

Permeability of the Ulm loam soil is slow to moderately slow. Available water capacity is about 8 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

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The potential plant community on the Absted and Stoneham soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre. The potential plant community on the Ulm soils is western wheatgrass, bluebunch wheatgrass, Indian ricegrass, and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

74--Petrie-Ulm complex, 0 to 10 percent slopes. This map unit is on toeslopes and fans in narrow drainageways below escarpments of shale and sandstone. Slopes are generally smooth but some areas are dissected by drainages. The native vegetation is mainly big sagebrush, western wheatgrass, gardner saltbush, birdfoot sagebrush, rubber rabbitbrush, and scattered greasewood. Elevation is 4500 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 45 percent Petrie silty clay loam, in narrow drainageways, and 30 percent Ulm loam, in slightly concave drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Cadoma silty clay loam on footslopes and fans, 5 percent Renohill clay loam on gently sloping toeslopes, and 5 percent Stoneham loam on narrow valley fills. Also included are small areas of Epsie and Worfka soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Petrie silty clay loam soil is deep and well drained. It formed in calcareous, saline, fine-textured alluvium derived dominantly from saline shale high in gypsum. Typically, the surface layer is light brownish gray silty clay loam about 6 inches thick. The subsoil is grayish brown to light yellowish brown silty clay about 60 inches thick. The soil is strongly to very strongly alkaline.

Permeability of the Petrie silty clay loam soil is slow to very slow. Available water capacity is about 7 to 11 inches. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Ulm loam soil is deep and well drained. It formed in calcareous fine-textured alluvium derived dominantly from mixed shale and sandstone. Typically, the surface layer is light brownish gray loam about 5 inches thick. The subsoil is light yellowish brown light clay about 10 inches thick. The substratum is very pale brown calcareous clay loam and sandy clay loam to a depth of 60 inches.

Permeability of the Ulm loam soil is moderately slow to slow. Available water capacity is about 8 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Petrie soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Ulm soils is mainly western and thickspike wheatgrass, bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

75--Arvada-Kim alkali complex, 0 to 10 percent slopes. This map unit is on low stream terraces, fans, and valley fills. Slopes are generally smooth but most areas have been deeply cut by drainage channels. The native vegetation is mainly greasewood, birdfoot sagebrush, alkali sacaton, Indian ricegrass, and rubber rabbitbrush. Elevation is 4400 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 40 percent Arvada fine sandy loam on fans and 35 percent Kim alkali loam along the drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Absted loam, 4 percent Kim loam, 4 percent Stoneham loam, and 2 percent Petrie silty clay loam. Also included are small areas of Fort Collins, Cadoma, Olney, and Orella soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Arvada fine sandy loam soil is deep and well drained. It formed in strongly alkaline stratified moderately fine-textured alluvium derived dominantly from mixed interbedded shale and sandstone. Typically, the surface layer is light gray fine sandy loam about 3 inches thick. The subsoil is pale brown and light brownish gray sandy clay about 10 inches thick. The substratum is light gray to pale brown sandy loam, loam, sandy clay loam, and silty clay about 50 inches thick. The subsoil and substratum are strongly or very strongly alkaline.

Permeability of the Arvada fine sandy loam soil is very slow. Available water capacity is about 5 to 8 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow in micro depressions and rapid elsewhere, and the hazard of water erosion is high. The hazard of soil blowing is moderate to low.

The Kim alkali loam soil is deep and moderately well drained. It formed in saline and alkaline loamy alluvial sediments derived dominantly from mixed shale and sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The underlying material to a depth of 60 inches is light brownish gray loam with lenses of sandy loam and silt loam. The soil is strongly alkaline.

Permeability of the Kim alkali loam soil is moderately slow to slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Arvada soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Kim alkali soils is mainly alkali sacaton, basin wildrye, and greasewood. The average annual production of air-dry vegetation ranges from 600 to 1200 pounds per acre.

93--Vona-Olney sandy loams, 0 to 10 percent slopes. This map unit is on gently to moderately sloping uplands. Slopes are smooth. The native vegetation is mainly bluegrama, needleandthread, pricklypear, threadleaf sedge, and big sagebrush. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 50 percent Vona sandy loam, on fans and toeslopes, and 30 percent Olney sandy loam, on fans and sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Terry sandy loam on ridges and 10 percent Bowbac sandy loam on footslopes and sideslopes. The percentage varies from one area to another.

The Vona sandy loam soil is deep and well drained. It formed in sandy materials derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is pale brown and brown sandy loam about 15 inches thick. The substratum is very pale brown calcareous sandy loam to a depth of 60 inches.

Permeability of the Vona sandy loam soil is moderately rapid. Available water capacity is about 5 to 8 inches. Effective rooting depth is 40 to 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Olney sandy loam soil is deep and well drained. It formed in sandy and loamy materials derived dominantly from sandstone. Typically, the surface layer is pale brown sandy loam about 4 inches thick. The subsoil is pale brown sandy clay loam about 14 inches thick. The substratum is pale brown loam to a depth of 60 inches.

Permeability of the Olney sandy loam soil is moderate to moderately rapid. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Vona and Olney soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

102--Rock outcrop, very steep. This map unit is on escarpments. Slope is 30 to more than 100 percent. Slopes are broken and irregular. Elevation is 4300 to 8000 feet. The average annual precipitation is about 10 to 20 inches, the average annual air temperature is 35 to 55 degrees F, and the average frost-free period is 30 to 140 days.

This unit is 90 percent Rock outcrop.

Also included are small areas of shallow and very shallow soils. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Rock outcrop is interbedded sandstone and shale.

Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

This unit is used for wildlife habitat.

109--Epsie-Rock outcrop complex, 3 to 60 percent slopes. This map unit is on nearly level to very steep interfluves, ridges, and sideslopes in the uplands. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, Indian ricegrass, and bottlebrush squirreltail. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Epsie silty clay on crests, ridges, and sideslopes, and 40 percent Rock outcrop on eroded slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Petrie silty clay loam and silty clay on narrow valley bottoms and fans, and 5 percent Cadoma silty clay loam on ridge tops and shoulders. The percentage varies from one area to another.

The Epsie silty clay soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from gypsiferous clay shale. Typically, the surface layer is light brownish gray silty clay about 3 inches thick. The subsoil is light brownish gray silty clay about 12 inches thick. The substratum is weathered gypsiferous clay shale. Depth to clay shale ranges from 6 to 20 inches. The soil is strongly or very strongly alkaline.

Permeability of the Epsie silty clay soil is very slow. Available water capacity is about ½ to 1 inch. Effective rooting depth is 6 to 12 inches. Runoff is rapid, and the hazard of water erosion is high. The soil is subject to piping. The hazard of soil blowing is low to moderate.

The Rock outcrop is weathered gypsiferous shale.

Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Epsie soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

110--Shingle-Tassel complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep backslopes of upland ridges. Slopes are smooth. The native vegetation is mainly threadleaf sedge, needleandthread, big sagebrush, scattered juniper, and bluegrama. Elevation is 4300 to 6200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 55 degrees F, and the average frost-free period is 100 to 140 days.

This unit is 50 percent Shingle loam, over silty shale, and 35 percent Tassel sandy loam, over sandstone. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Rock outcrop on small escarpments, 3 percent Bondman fine sandy loam on ridge crests, and 2 percent Worf loam on ridge crests. Also included are small areas of Terry, Nelson, and Thedalund. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray loam about 7 inches thick over soft interbedded shale and sandstone. Depth to underlying bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Tassel sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is light gray sandy loam about 7 inches thick over fractured or massive sandstone. Depth to sandstone bedrock ranges from 10 to 20 inches.

Permeability of the Tassel sandy loam soil is moderately rapid. Available water capacity is about ½ to 1½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Shingle soils is bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Tassel soils is mainly bluebunch wheatgrass, Indian ricegrass, and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

111--Rock outcrop-Shingle-Tassel complex, 3 to 60 percent slopes. This map unit is on gently sloping to steep hills. Slopes are irregular and broken by bedrock escarpments. The native vegetation is mainly threadleaf sedge, needleandthread, and big sagebrush, with scattered juniper and limber pine. Elevation is 4300 to 6500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 55 degrees F, and the average frost-free period is 90 to 140 days.

This unit is 30 percent Rock outcrop on escarpments and ridge tops, 25 percent Shingle loam on steep broken slopes over shale, and 25 percent Tassel sandy loam on steep broken slopes over sandstone. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent very shallow Torriorthents on convex ridges and steeper slopes, 3 percent Thedalund loam on footslopes and slightly concave areas, and 2 percent Nelson sandy loam on footslopes and slightly concave areas. Also included are small areas of Worf, Bondman, Nihill, Bowbac, Terry, and Cushman soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Rock outcrop is sandstone and shale.

Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is high.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray loam about 7 inches thick over soft interbedded shale and sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Tassel sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is light gray sandy loam about 7 inches thick over fractured or massive sandstone. Depth to sandstone bedrock ranges from 10 to 20 inches.

Permeability of the Tassel sandy loam soil is moderately rapid. Available water capacity is about ½ to 1½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

111--Continued

The potential plant community on the Shingle soils is bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Tassel soils is mainly Indian ricegrass, needleandthread, and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

112--Oceanet-Persayo-Rock outcrop complex, 3 to 60 percent slopes. This map unit is on gently sloping to steep hills. Slopes are irregular and broken by bedrock escarpments and drainages. The native vegetation is mainly threadleaf sedge, needleandthread, big sagebrush, bluegrama, snakeweed, scattered gardner saltbush and birdfoot sagebrush. Elevation is 4300 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 25 percent Oceanet sandy loam on backslopes over sandstone, 25 percent Persayo clay loam on smooth backslopes over shale, and 25 percent Rock outcrop on escarpments and eroded ridges. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent very shallow Torriorthents on convex ridges and escarpments, 5 percent Pavillion loam on footslopes and concave areas, 3 percent Worland fine sandy loam on footslopes, and 2 percent Effington Variant loam on fans and footslopes. Also included are small areas of Uffens, Mudray, and Clifterson soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Oceanet sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone bedrock. Typically, the surface layer is very pale brown sandy loam about 3 inches thick. The subsoil is pale brown sandy loam about 6 inches thick. The underlying layer is light gray loamy sand about 3 inches thick over calcareous sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Oceanet fine sandy loam soil is moderately rapid. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Persayo clay loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty alkaline shale. Typically, the surface layer is light gray light clay loam about 3 inches thick. The subsoil is light brownish gray calcareous moderately to strongly alkaline silty clay loam about 11 inches thick over soft silty shale with some gypsum. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Persayo clay loam soil is moderately slow. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Rock outcrop is sandstone and shale.

Runoff is excessive, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

112--Continued

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Oceanet soils is mainly needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre. The potential plant community on the Persayo soils is mainly bluebunch wheatgrass, thickspike and western wheatgrass, Indian ricegrass, gardner saltbush, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre.

190--Epsie-Shingle complex, 6 to 45 percent slopes. This map unit is on sloping to steep uplands. Slopes are generally smooth but irregular in dissected areas. The native vegetation is mainly gardner saltbush, bluebunch wheatgrass, birdfoot sagebrush, Sandberg bluegrass, Indian ricegrass, big sagebrush, and rubber rabbitbrush. Elevation is 4400 to 5800 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 45 percent Epsie silty clay on smooth rounded knolls and sideslopes and 30 percent Shingle loam on crests and steeper sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Cadoma silty clay loam on fans and footslopes, 3 percent Cushman loam on footslopes and lower sideslopes, 3 percent Thedalund loam on narrow bottoms and fans, and 4 percent Rock outcrop on ridge crests. Also included are small areas of Orella, Tassel, Worf, and Petrie soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Epsie silty clay soil is shallow to clay shale and well drained. It formed in fine-textured residuum derived dominantly from gypsiferous clay shale. Typically, the surface layer is light brownish gray silty clay about 3 inches thick. The subsoil is light brownish gray silty clay about 12 inches thick. The substratum is weathered gypsiferous clay shale. Depth to clay shale ranges from 10 to 20 inches. The soil is strongly to very strongly alkaline.

Permeability of the Epsie silty clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The soil is subject to piping. The hazard of soil blowing is moderate.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray loam about 8 inches thick over soft interbedded shale and sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Epsie soil is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Shingle soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

192--Cadoma-Shingle-Rock outcrop complex, 3 to 60 percent slopes. This map unit is on gently sloping to steep hill slopes cut by deep drainages. Slopes are generally smooth but are broken by steep cuts into drainageways and Rock outcrop escarpments. The native vegetation is mainly gardner saltbush, bluebunch wheatgrass, birdfoot sagebrush, needleandthread, Indian ricegrass, big sagebrush, and snakeweed. Elevation is 4400 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 30 percent Cadoma silty clay loam on footslopes, sideslopes and fans, 25 percent Shingle loam near the crest of the ridges, and 20 percent Rock outcrop on escarpments and eroded drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Epsie silty clay on rounded knolls and footslopes, 5 percent Worfka loam on ridge tops and upper slopes, 3 percent Petrie silty clay loam on narrow valley floors, and 2 percent Orella silty clay on ridge crests. Also included are small areas of Renohill, Tassel, Samsil, and Worf soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous clay shale. Typically, the surface layer is very pale brown strongly alkaline silty clay loam about 4 inches thick. The subsoil is pale brown very strongly alkaline silty clay loam about 14 inches thick. The substratum is pale brown strongly alkaline silty clay loam about 12 inches thick over gypsiferous clay shale. Depth to shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is pale brown loam about 7 inches thick over soft interbedded shale and sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Rock outcrop is interbedded shale and sandstone.

Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is high.

192--Continued

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Cadoma soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Shingle soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

243--Kim alkali-Kim loams, 0 to 6 percent slopes. This map unit is on alluvial fans, low terraces, and valley fills. Slopes are generally smooth. Some areas are dissected by drainage channels. The native vegetation is mainly big sagebrush, greasewood, western wheatgrass, and bottlebrush squirreltail. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Kim alkali loam on lower fanslopes and bottoms and 30 percent Kim loam on fans and footslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Stoneham loam on fans and 5 percent Thedalund loam on footslopes and fans. Also included are small areas of Arvada, Absted, and Cadoma soils. Included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Kim alkali loam soil is deep and moderately well drained. It formed in loamy saline and alkaline alluvial sediments derived dominantly from shale and sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The underlying material to a depth of 60 inches is light brownish gray strongly alkaline loam with lenses of silt and fine sand.

Permeability of the Kim alkali loam soil is moderately slow to slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is high. The hazard os soil blowing is moderate.

The Kim loam soil is deep and well drained. It formed in loess and alluvial sediments derived dominantly from mixed sandstone and silty shale. Typically, the surface layer is light brownish gray loam about 6 inches thick. The underlying material to a depth of 60 inches is light brownish gray loam.

Permeability of the Kim loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife. Some irrigated areas are used for the production of hay and pasture.

The potential plant community on the Kim alkali soils is alkali sacaton, basin wildrye, and greasewood. The average annual production of air-dry vegetation ranges from 600 to 1200 pounds per acre. The potential plant community on the Kim soils is bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass.

244--Kim alkali loam, 0 to 6 percent slopes. This deep, moderately well drained soil is on alluvial fans and low terraces along drainageways. It formed in loamy saline and alkaline alluvial sediments derived dominantly from shale and sandstone. Slopes are dominately smooth but are dissected by drainage channels. The native vegetation is mainly greasewood, western wheatgrass, bottlebrush squirreltail, and woody aster. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is light brownish gray loam about 4 inches thick. The underlying material to a depth of 60 inches is light brownish gray strongly alkaline clay loam with lenses of silt and fine sand.

Included in this unit is about 10 percent Kim loam on similar sites and 5 percent Arvada silty clay loam in slightly concave micro depressions. Also included are small areas of Thedalund, Petrie, and Cadoma soils. These included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Kim alkali loam soil is moderately slow to slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for range, hay, and pasture that is grazed by both domestic livestock and wildlife.

The potential plant community on this unit is mainly alkali sacaton, basin wildrye, and greasewood. The average annual production of air-dry vegetation ranges from 600 to 1200 pounds per acre.

245--Orella silty clay, 0 to 15 percent slopes. This shallow, well drained sodic soil is on undulating to rolling uplands. It formed in strongly alkaline fine-textured residuum derived dominantly from gypsiferous clay shales high in salt. Slopes are dominately complex and cut by some drainage dissections. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, and Indian ricegrass, with some alkali sacaton along the drainages. Elevation is 4400 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is light brownish gray silty clay about 3 inches thick. The subsoil is light grayish brown very strongly alkaline clay about 13 inches thick. The substratum is strongly alkaline weathered clay shale. Depth to clay shale ranges from 10 to 20 inches.

Included in this unit is about 12 percent Cadoma silty clay loam soils on sideslopes and toeslopes, 10 percent Epsie silty clay on ridge crests and knolls, and 3 percent Arvada loam on narrow bottoms and fan terraces. The percentage varies from one area to another.

Permeability of this Orella silty clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is low to moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on this unit is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

246--Orella-Epsie-Rock outcrop complex, 0 to 45 percent slopes. This map unit is on gently sloping to steep uplands. Slopes are generally smooth but with irregular escarpments and dissected drainageways. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, bottlebrush squirreltail, and povertyweed, with alkali sacaton along some drainages. Elevation is 4400 to 5800 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Orella silty clay on sideslopes, 25 percent Epsie silty clay on crests and along drainages, and 20 percent Rock outcrop on escarpments and eroded areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 6 percent Cadoma silty clay loam on footslopes and sideslopes, 3 percent Shingle loam on ridge crests next to Rock outcrop, and 1 percent Worfka clay loam in slightly concave swales. The percentage varies from one area to another.

The Orella silty clay soil is shallow and well drained. It formed in strongly alkaline fine-textured residuum derived dominantly from saline clay shale. Typically, the surface layer is light brownish gray silty clay about 1 inch thick over pale brown clay about 3 inches thick. The subsoil is pinkish gray very strongly alkaline clay about 14 inches thick over alkaline clay shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Orella silty clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is low to moderate.

The Epsie silty clay soil is shallow to clay shale and well drained. It formed in fine-textured residuum derived dominantly from gypsiferous clay shale. Typically, the surface layer is light gray silty clay about 3 inches thick. The subsoil is gray silty clay about 12 inches thick. The substratum is dark gray clay weathered from gypsiferous clay shale about 4 inches thick over dark gray shale. Depth to shale ranges from 10 to 20 inches. The soil is strongly to very strongly alkaline.

Permeability of the Epsie silty clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The soil is subject to piping. The hazard of soil blowing is low to moderate.

The Rock outcrop is clay shale and some sandstone.

Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

246--Continued

The potential plant community on the Orella and Epsie soils is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

247--Torriorthents, severely eroded, 0 to 15 percent slopes. These shallow to deep, well drained soils are along eroded drainageways on gullied sideslopes, narrow bottoms, and remnants of the gently sloping to moderately steep uplands. They formed in residuum, colluvium and alluvium derived dominantly from sedimentary rocks. Slopes are irregular and broken. The native vegetation is mainly highly variable. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 55 degrees F, and the average frost-free period is 100 to 140 days.

The surface layer is about 6 inches thick and varies widely in color and texture. The subsoil ranges from sandy loam to clay. Depth to bedrock ranges from 6 to 60 inches or more.

Included in this unit is about 10 percent Torrifluvents on the larger drainage bottoms and 15 percent Natrargids on the upland remnants. The percentage varies from one area to another.

Permeability of these Torriorthents is medium to slow. Available water capacity is about 1 to 6 inches. Effective rooting depth is 6 to 60 inches. Runoff is rapid, and the hazard of water erosion is severe. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on this unit is highly variable.

315--Persayo-Clifterson complex, 3 to 45 percent slopes. This map unit is on shoulders and steep sideslopes of old upland benches. Slopes are complex. The native vegetation is mainly bluegrama, big sagebrush, bud sagebrush, pricklypear, bluebunch wheatgrass, and bottlebrush squirreltail. Elevation is 4500 to 5500 feet. The average annual precipitation is about 5 to 9 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Persayo gravelly clay loam on the steep sideslopes and 30 percent Clifterson very gravelly loam on the upper shoulder of the bench lands. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent shale and sandstone Rock outcrop on steep escarpments, 3 percent Oceanet sandy loam on sandstone controlled uplands, and 2 percent Preatorson gravelly loam on the upper sideslopes. Also included are small areas of Mudray, Pavillion, Effington variant, and Uffens soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Persayo gravelly clay loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from alkaline shale and gravel beds. Typically, the surface layer is light brownish gray gravelly clay loam about 4 inches thick. It has a surface accumulation of pebbles and cobbles. The subsoil is light brownish gray strongly alkaline silty clay loam about 11 inches thick. The underlying material is soft shale or sandstone. Depth to soft bedrock ranges from 10 to 20 inches.

Permeability of the Persayo gravelly clay loam soil is slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to low.

The Clifterson very gravelly loam soil is shallow to gravelly sand and well drained. It formed in very gravelly or very cobbly loamy alluvium derived dominantly from mixed igneous and sedimentary rocks. Typically, the surface layer is light brownish gray very gravelly loam about 2 inches thick. The subsoil is light gray and light brownish gray very gravelly sandy loam about 60 inches thick.

Permeability of the Clifterson gravelly loam soil is moderately rapid to rapid. Available water capacity is about 2 to 4 inches. Effective rooting depth is 10 to 20 inches. Runoff is low to moderate, and the hazard of water erosion is low. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Persayo soils is mainly gardner saltbush, bottlebrush squirreltail, Indian ricegrass, bluebunch wheatgrass, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre. The potential plant community on the Clifterson soils is big sagebrush, bluebunch wheatgrass, and needleandthread. The average annual production of air-dry vegetation ranges from 100 to 300 pounds per acre.

322--Nihill-Shingle gravelly loams, 3 to 45 percent slopes. This map unit is on margins, shoulders, and sideslopes of old high upland terraces, benches, and hills. Slopes are generally convex. The native vegetation is mainly bluegrama, threadleaf sedge, scattered big sagebrush, and phlox. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Nihill gravelly loam on benches and over conglomerate beds and 30 percent Shingle gravelly loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Tassel sandy loam on sideslopes over sandstone bedrock, 5 percent Larimer loam and Larim gravelly sandy loam on narrow ridges and small benches, 5 percent Thedalund loam on footslopes and fans, and 10 percent Rock outcrop mostly on sideslopes. The percentage varies from one area to another.

The Nihill gravelly loam soil is deep and well drained. It formed in gravelly and cobbly sediments derived dominantly from mixed rock sources. Typically, the surface layer is grayish brown gravelly loam about 6 inches thick. The subsoil is light brownish gray and brownish gray calcareous very gravelly loam about 24 inches thick. The substratum to a depth of 60 inches is light brownish gray calcareous very gravelly loamy sand.

Permeability of the Nihill gravelly loam soil is moderately rapid. Available water capacity is about 3 to 5 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is low. The hazard of soil blowing is low.

The Shingle gravelly loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and sandstone. Typically, the surface layer is light brownish gray gravelly loam about 4 inches thick. It has a surface accumulation of pebbles and cobbles. The subsoil is light brownish gray loam about 7 inches thick. The underlying material is soft interbedded sandstone and shale bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Shingle gravelly loam soil is moderate. Available water capacity is about ½ to 1½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Nihill gravelly loam soil is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 100 to 450 pounds per acre. The potential plant community on the Shingle gravelly loam is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

323--Nihill cobbly loam, 3 to 45 percent slopes. This deep, well drained soil is on upland benches and sideslopes. It formed in gravelly and cobbly material derived dominantly from conglomerate. Slopes are generally smooth and convex. The native vegetation is mainly bluegrama, threadleaf sedge, phlox, and scattered big sagebrush. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

Typically, the surface layer is grayish brown cobbly loam about 6 inches thick. The subsoil is light brownish gray calcareous very cobbly loam about 24 inches thick. The substratum to a depth of 60 inches or more is light brownish gray calcareous very cobbly loam.

Included in this unit is about 10 percent Shingle gravelly or cobbly loam on sideslopes and lower interfluves, and 5 percent Larim gravelly sandy loam on small terraces. The percentage varies from one area to another.

Permeability of this Nihill cobbly loam soil is moderately rapid. Available water capacity is about 3 to 5 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate to rapid, and the hazard of water erosion is low. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on this unit is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 100 to 450 pounds per acre.

324--Larimer-Nihill complex, 3 to 45 percent slopes. This map unit is on gently sloping high terraces or old alluvial fans and on steep terrace scarps and interfluves. Slopes are smooth. The native vegetation is mainly bluegrama, western wheatgrass, needleandthread, and pricklypear. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Larimer loam on terraces and 40 percent Nihill gravelly loam on steep sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Larim gravelly loam on shoulders of terraces and interfluves, 5 percent Shingle cobbly loam on lower sideslopes and interfluves, and 10 percent Larimer gravelly sandy loam on high terraces. The percentage varies from one area to another.

The Larimer loam soil is moderately deep to sand and gravel and well drained. It formed in old mixed alluvial sediments derived dominantly from conglomerate. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is pale brown light clay loam about 8 inches thick. The substratum is light gray strongly calcareous loam and clay loam about 10 inches thick over very gravelly sand. Depth to lime-coated gravel, cobbles, and sand ranges from 20 to 40 inches.

Permeability of the Larimer loam soil is moderate above the gravel. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Nihill gravelly loam soil is deep and well drained. It formed in gravelly and cobbly alluvium derived dominantly from conglomerate. Typically, the surface layer is brown and pale brown gravelly loam about 5 inches thick. The subsoil is pale brown calcareous very cobbly loam about 25 inches thick. The substratum to a depth of 60 inches is very pale brown calcareous very gravelly loam.

Permeability of the Nihill gravelly and cobbly loam soil is moderately rapid. Available water capacity is about 3 to 5 inches. Effective rooting depth is 40 to 60 inches or more. Runoff is low to moderate, and the hazard of water erosion is low. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Larimer loam soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre. The potential plant community on the Nihill soils is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 100 to 450 pounds per acre.

325--Larimer-Stoneham-Nihill complex, 3 to 30 percent slopes. This map unit is on gently sloping fans and terraces and on steep sideslopes of interfluves. Slopes are generally smooth with some dissection of shallow drainages. The native vegetation is mainly big sagebrush, bluegrama, bluebunch wheatgrass, western wheatgrass, needleandthread, and pricklypear. Elevation is 4400 to 5800 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 30 percent Larimer loam on fans and terraces, 30 percent Stoneham loam on fans, and 20 percent Nihill gravelly loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Cushman loam on footslopes and the upper portion of fans, 3 percent Larim gravelly loam on the shoulder of slopes into drainages, and 2 percent Kim loam on the lower portion of fans and on narrow valley bottoms. Also included are small areas of Fort Collins, Thedalund, and Shingle soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Larimer loam soil is moderately deep to sand and gravel and well drained. It formed in loamy alluvium and loess over gravel derived dominantly from mixed sedimentary and igneous rocks. Typically, the surface layer is light brownish gray loam about 2 inches thick. The subsoil is pale brown light clay loam about 8 inches thick. The substratum is light gray strongly calcareous loam and clay loam about 10 inches thick over very gravelly and cobbly sand. Depth to sand and gravel ranges from 20 to 40 inches.

Permeability of the Larimer loam soil is moderate. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Stoneham loam soil is deep and well drained. It formed in loamy alluvium and loess derived dominantly from silty shale and fine grained sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray light clay loam about 6 inches thick. The substratum is pale brown loam and sandy clay loam to a depth of 60 inches.

Permeability of the Stoneham loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Nihill gravelly loam soil is deep and well drained. It formed in gravelly and cobbly alluvium derived dominantly from mixed sedimentary and igneous rocks. Typically, the surface layer is light grayish brown gravelly loam about 6 inches thick. The subsoil is light brownish gray very gravelly loam about 24 inches thick. The substratum to a depth of 60 inches or more is very gravelly loamy sand.

325--Continued

Permeability of the Nihill gravelly loam soil is moderately rapid. Available water capacity is about 3 to 5 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is low. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife. Locally some areas are irrigated and used for hay production.

The potential plant community on the Larimer and Stoneham soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre. The potential plant community on the Nihill soils is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 100 to 450 pounds per acre.

345--Vona-Otero sandy loams, 3 to 15 percent slopes. This map unit is on toeslopes and valley fills adjacent to sanstone uplands. Slopes are generally smooth and dissected by drainages. The native vegetation is mainly big sagebrush, needleandthread, bluegrama, and threadleaf sedge. Elevation is 4500 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Vona sandy loam on fans and footslopes, and 35 percent Otero sandy loam on drainage bottoms and fans. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Terry sandy loam on toeslopes and concave positions, 5 percent Nelson sandy loam on sideslopes and fans, and 5 percent Tassel sandy loam on ridge crests and knolls. The percentage varies from one area to another.

The Vona sandy loam soil is deep and well drained. It formed in sandy alluvium or eolian deposits derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 5 inches thick. The subsoil is pale brown sandy loam about 16 inches thick. The substratum is pale brown calcareous sandy loam to a depth of 60 inches.

Permeability of the Vona sandy loam soil is moderately rapid. Available water capacity is about 5 to 8 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Otero sandy loam soil is deep and well drained. It formed in sandy alluvium and eolian deposits derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 8 inches thick. The subsoil is light brownish gray calcareous sandy loam to a depth of 60 inches.

Permeability of the Otero sandy loam soil is rapid. Available water capacity is about 5 to 8 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community is mainly needleandthread and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

346--Nelson-Terry-Otero complex, 3 to 20 percent slopes. This map unit is on upland knolls, hills, and ridges. Slopes are smooth. The native vegetation is mainly bluegrama, threadleaf sedge, needleandthread, prickly-pear, bluebunch wheatgrass, and big sagebrush. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 30 percent Nelson fine sandy loam on sideslopes, 30 percent Terry sandy loam on footslopes, and 20 percent Otero sandy loam on fans. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 12 percent Tassel sandy loam on crests of ridges and knolls and 8 percent Vona sandy loam on footslopes and fans. The percentage varies from one area to another.

The Nelson fine sandy loam soil is moderately deep and well drained. It formed in moderately coarse-textured calcareous residuum and alluvium derived dominantly from sandstone. Typically, the surface layer is light brownish gray and pale brown calcareous fine sandy loam about 9 inches thick. The subsoil is light gray loamy very fine sand about 19 inches thick over soft sandstone. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Nelson fine sandy loam soil is moderately rapid. Available water capacity is about 2½ to 5 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Terry sandy loam soil is moderately deep and well drained. It formed in moderately coarse-textured calcareous sediments derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 3 inches thick. The subsoil is brown to light yellowish brown fine sandy loam about 15 inches thick. The substratum is light gray calcareous fine sandy loam about 12 inches thick over bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Terry sandy loam soil is moderately rapid. Available water capacity is about 2½ to 5 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Otero sandy loam soil is deep and well drained. It formed in alluvial and wind-modified sediments derived dominantly from sandstone bedrock. Typically, the surface layer is pale brown to brown sandy loam about 8 inches thick. The subsoil is pale brown calcareous sandy loam to a depth of 60 inches.

Permeability of the Otero fine sandy loam soil is rapid. Available water capacity is about 5 to 8 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

346--Continued

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on these soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

360--Stoneham-Kim association, nearly level and gently sloping. This map unit is on valley floors, footslopes, and alluvial fans. Slope is 1 to 10 percent. Slopes are smooth. The native vegetation is mainly blue-grama, western wheatgrass, big sagebrush, rubber rabbitbrush, and prickly-pear. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 100 to 140 days.

This unit is 50 percent Stoneham loam on nearly level to gently sloping fans and 30 percent Kim loam on nearly level drainage bottoms. Included in this unit is about 8 percent Cushman loam on footslopes, 5 percent Thedalund loam on footslopes, 5 percent Fort Collins on fans and footslopes, and 2 percent Kim alkali on toeslopes. The percentage varies from one area to another.

The Stoneham loam soil is deep and well drained. It formed in loamy alluvial sediments derived dominantly from weathered sandstone and shale. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is brown grading to pale brown light clay loam about 6 inches thick. The substratum is pale brown loam to a depth of 60 inches or more.

Permeability of the Stoneham loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Kim loam soil is deep and well drained. It formed in loess and alluvial sediments derived dominantly from mixed sandstone and silty shales. Typically, the surface layer is light brownish gray loam about 6 inches thick. The subsoil is light brownish gray loam, with lenses of silt loam, to a depth of 60 inches.

Permeability of the Kim loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Some areas are irrigated for pasture and hay.

The potential plant community on the Stoneham soils is mainly blue-bunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre. The potential plant community on the Kim soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

371--Pavillion-Persayo complex, 3 to 45 percent slopes. This map unit is on upland ridges, truncated footslopes, fans, and benches. Slopes are irregular and broken. The native vegetation is mainly big sagebrush, bluebunch wheatgrass, bluegrama, prairie junegrass, and birdfoot sagebrush. Elevation is 4300 to 5800 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Pavillion loam on truncated footslopes and fans and 35 percent Persayo clay loam on upland ridges and eroded benches. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on sandstone and shale escarpments, 5 percent Oceanet sandy loam on shoulders and crests of ridges and knolls, 3 percent Worland fine sandy loam on lower sideslopes, and 3 percent Glenton loam and 4 percent Youngston loam on alluvial fans and drainage bottoms. The percentage varies from one area to another.

The Pavillion loam soil is moderately deep and well drained. It formed in loess and alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light brownish gray loam about 5 inches thick. The subsoil is light brownish gray loam and silty clay loam about 21 inches thick. The underlying material is soft, fine-grained sandstone and silty shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Pavillion loam soil is moderate. Available water capacity is about 4 to 8 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate to high. The hazard of soil blowing is moderate.

The Persayo clay loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from alkaline silty shales. Typically, the surface layer is light gray light clay loam about 3 inches thick. The subsoil is light gray moderately to strongly alkaline calcareous silty clay loam about 10 inches thick. The underlying material is soft silty shale with some gypsum crystals. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Persayo clay loam soil is moderately slow. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Pavillion loam soil is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and big sagebrush. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre. The potential plant community on the Persayo soil is mainly Indian ricegrass, bottlebrush squirreltail, and gardner saltbush. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre.

372--Tassel-Nelson sandy loams, 3 to 45 percent slopes. This map unit is on upland hills and ridges. Slopes are irregular. The native vegetation is mainly bluegrama, threadleaf sedge, needleandthread, big sagebrush, and pricklypear. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 50 percent Tassel sandy loam on steep sideslopes and ridge crests and 25 percent Nelson sandy loam on footslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 12 percent Rock outcrop on escarpments and eroded ridges, 8 percent Shingle loam on steep broken slopes over shale, and 5 percent Terry sandy loam on footslopes and alluvial fans. The percentage varies from one area to another.

The Tassel sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is light gray sandy loam about 7 inches thick. The underlying material is fractured sandstone. Depth to sandstone or silty shale bedrock ranges from 10 to 20 inches.

Permeability of the Tassel sandy loam soil is moderately rapid. Available water capacity is about ½ to 1½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Nelson sandy loam soil is moderately deep and well drained. It formed in moderately coarse-textured calcareous sediments derived dominantly from sandstone bedrock. Typically, the surface layer is light brownish gray calcareous sandy loam about 4 inches thick. The subsoil is light brown fine sandy loam about 30 inches thick. Depth to sandstone bedrock ranges from 20 to 40 inches.

Permeability of the Nelson sandy loam soil is moderately rapid. Available water capacity is about 2½ to 5 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Tassel soils is mainly needleandthread, bluebunch wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Nelson soils is mainly needleandthread and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

373--Neville-Tensleep association, gently sloping and sloping. This map unit is on toeslopes, fans, and alluvial bottoms adjacent to red bed shales. Slope is 1 to 10 percent. Slopes are smooth. The native vegetation is mainly needleandthread, western wheatgrass, Sandberg bluegrass, and big sagebrush. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 45 percent Neville very fine sandy loam on alluvial bottoms and 35 percent Tensleep very fine sandy loam on toeslopes and fans.

Included in this unit is about 10 percent Spearfish very fine sandy loam on upland sideslopes, 5 percent Rekop loam on upland backslopes, and 5 percent Gystrum loam on upland backslopes. The percentage varies from one area to another.

The Neville very fine sandy loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from red silty shales. Typically, the surface layer is reddish brown very fine sandy loam about 5 inches thick. The subsoil is reddish brown stratified silt loam and very fine sandy loam to a depth of 60 inches.

Permeability of the Neville very fine sandy loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Tensleep very fine sandy loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from red bed shales. Typically, the surface layer is brown very fine sandy loam about 4 inches thick. The subsoil is brown silt loam about 10 inches thick. The substratum is light brown silt loam to a depth of 60 inches.

Permeability of the Tensleep very fine sandy loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Some areas adjacent to streams are being irrigated for hay, small grain, and pasture.

The potential plant community on the Tensleep and Neville soils is mainly bluebunch wheatgrass and needleandthread.

375--Bowbac-Olney-Arvada complex, 0 to 15 percent slopes. This map unit is on gently rolling uplands with some drainage dissection. Slopes are generally smooth and complex. The native vegetation is mainly birdfoot sagebrush, gardner saltbush, and bottlebrush squirreltail on the Arvada soil and needleandthread, Indian ricegrass, and bluebunch wheatgrass on the Bowbac and Olney soil. Elevation is 4500 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 30 percent Bowbac fine sandy loam on sideslopes, 25 percent Olney sandy loam on footslopes and concave swales, and 25 percent Arvada loam on ridge crests and drainageways. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Terry sandy loam on sideslopes over sandstone, 5 percent Tassel sandy loam on ridge crests over sandstone, and 5 percent Rock outcrop on ridge crests and eroded slopes. The percentage varies from one area to another. Some Arvada-like soils are only moderately deep.

The Bowbac fine sandy loam soil is moderately deep and well drained. It formed in sandy and loamy alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light brownish gray fine sandy loam about 5 inches thick. The subsoil is yellowish brown sandy clay loam about 12 inches thick. The substratum is calcareous sandy clay loam about 10 inches thick over sandstone bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Bowbac fine sandy loam soil is moderate. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to high.

The Olney sandy loam soil is deep and well drained. It formed in sandy and loamy alluvium derived dominantly from sandstone. Typically, the surface layer is pale brown sandy loam about 4 inches thick. The subsoil is brown sandy clay loam grading to loam about 18 inches thick. The substratum is pale brown sandy loam to a depth of 60 inches.

Permeability of the Olney sandy loam soil is moderately rapid. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Arvada loam soil is deep and well drained. It formed in strongly alkaline fine-textured alluvium derived dominantly from alkaline shale and sandstone. Typically, the surface layer is light gray loam about 3 inches thick. The subsoil is light yellowish brown very strongly alkaline clay about 9 inches thick. The substratum is light brownish gray clay and clay loam about 50 inches thick over shale or sandstone.

Permeability of the Arvada loam soil is very slow. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

375--Continued

This unit is used for grazing by both domestic livestock and wildlife. Locally some areas are irrigated for hay production.

The potential plant community on the Bowbac and Olney soils is mainly needleandthread and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre. The potential plant community on the Arvada soil is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

382--Rock outcrop-Tassel complex, 3 to 60 percent slopes. This map unit is on gently sloping to steep hilly uplands. Slopes are irregular and broken by bedrock escarpments. The native vegetation is mainly needleandthread, threadleaf sedge, bluegrama, and big sagebrush with scattered juniper and limber pine. Elevation is 4400 to 6400 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 55 degrees F, and the average frost-free period is 90 to 140 days.

This unit is 40 percent Rock outcrop on escarpments and ridge tops and 40 percent Tassel sandy loam on backslopes over sandstone. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Shingle loam over silty shale, 5 percent Nelson sandy loam on sideslopes and footslopes, and 5 percent Terry sandy loam on slightly concave slopes. The percentage varies from one area to another. Some Tassel-like soils are only from 6 to 10 inches in depth over bedrock.

The Rock outcrop is sandstone and shale.

Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is low.

The Tassel sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is light gray calcareous sandy loam about 7 inches thick over sandstone. Depth to fractured or massive sandstone bedrock ranges from 10 to 20 inches.

Permeability of the Tassel sandy loam soil is moderately rapid. Available water capacity is about ½ to 1 inch. Effective rooting depth is 6 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife and harvest of firewood and posts.

The potential plant community on the Tassel soil is mainly needleandthread, bluebunch wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

383--Rock outcrop-Tassel-Nelson complex, 3 to 60 percent slopes. This map unit is on gently sloping to steep uplands. Slopes are irregular and broken by bedrock exposures. The native vegetation is mainly bluegrama, threadleaf sedge, needleandthread, big sagebrush, and pricklypear. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 30 percent Rock outcrop on escarpments and eroded ridges, 30 percent Tassel sandy loam on backslopes and some ridge crests, and 20 percent Nelson sandy loam on footslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 14 percent Shingle loam on steep slopes over shale and 6 percent Terry sandy loam on footslopes and fans. The percentage varies from one area to another.

The Tassel sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone bedrock. Typically, the surface layer is light brownish gray sandy loam about 3 inches thick. The subsoil is light gray and very pale brown sandy loam about 15 inches thick. The underlying material is fractured sandstone bedrock. Depth to sandstone or silty shale bedrock ranges from 10 to 20 inches.

Permeability of the Tassel sandy loam soil is moderately rapid. Available water capacity is about ½ to 1½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Nelson fine sandy loam soil is moderately deep and well drained. It formed in moderately coarse-textured calcareous sediments derived dominantly from weathered sandstone. Typically, the surface layer is light brownish gray calcareous fine sandy loam about 4 inches thick. The subsoil is light brown fine sandy loam about 30 inches thick. Depth to sandstone bedrock ranges from 20 to 40 inches.

Permeability of the Nelson fine sandy loam soil is moderately rapid. Available water capacity is about 2½ to 5 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Tassel soils is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Nelson soils is mainly needleandthread and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

389--Spearfish-Neville association, gently sloping and steep. This map unit is on broken slopes of the red shale beds and on alluvial bottoms below the red beds. Slope is 1 to 45 percent. Slopes are smooth in the bottoms and irregular and broken in the uplands. The native vegetation is mainly needleandthread, Indian ricegrass, western wheatgrass, rubber rabbitbrush, and big sagebrush. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Spearfish very fine sandy loam and 30 percent Neville very fine sandy loam.

Included in this unit is about 10 percent Rock outcrop on ridges and escarpments, 5 percent Tensleep very fine sandy loam on toeslopes and alluvial bottoms, and 5 percent Rekop loam and Gystrum loam on upland backslopes. The percentage varies from one area to another.

The Spearfish very fine sandy loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from red shale. Typically, the surface layer is reddish brown very fine sandy loam about 2 inches thick. The subsoil is reddish brown loam about 14 inches thick over red silty shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Spearfish very fine sandy loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

The Neville very fine sandy loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from red silty shale. Typically, the surface layer is reddish brown very fine sandy loam about 5 inches thick. The subsoil is reddish brown and yellowish red loam to a depth of 60 inches.

Permeability of the Neville very fine sandy loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Some Neville soil adjacent to streams is being irrigated for hay, small grain, and pasture.

The potential plant community on the Neville and Spearfish soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 on Spearfish and from 500 to 1100 on Neville.

393--Olney-Bowbac fine sandy loams, 3 to 15 percent slopes. This map unit is on gently sloping to sloping ridge tops, sideslopes, fans, and footslopes. Slopes are smooth and both convex and concave. The native vegetation is mainly bluegrama, needleandthread, threadleaf sedge, big sagebrush, and pricklypear. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Olney fine sandy loam on sideslopes, footslopes, and concave pastures, and 35 percent Bowbac fine sandy loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Terry sandy loam on crests of ridge and sideslopes, 10 percent Vona sandy loam on toeslopes and alluvial fans, 3 percent Thedalund loam on footslopes, and 2 percent Bondman sandy loam on benches. The percentage varies from one area to another.

The Olney fine sandy loam soil is deep and well drained. It formed in sandy and loamy sediments derived dominantly from weathered sandstone. Typically, the surface layer is pale brown fine sandy loam about 4 inches thick. The subsoil is brown sandy clay loam grading to loam about 18 inches thick. The substratum is pale brown sandy loam to a depth of 60 inches.

Permeability of the Olney fine sandy loam soil is moderate to moderately rapid. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Bowbac fine sandy loam soil is moderately deep and well drained. It formed in sandy and loamy materials derived dominantly from alluvial sediments from sandstone and shale. Typically, the surface layer is light brownish gray fine sandy loam about 3 inches thick. The subsoil is pale brown sandy clay loam about 11 inches thick. The underlying material is pale brown and light gray calcareous clay loam about 16 inches thick over fractured sandstone. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Bowbac fine sandy loam soil is moderate. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to high.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on Olney and Bowbac soils is mainly needleandthread and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

394--Saddle-Oceanet fine sandy loams, 0 to 15 percent slopes. This map unit is on undulating and rolling benches. Slopes are smooth to irregular. The native vegetation is mainly big sagebrush, needleandthread, blue-grama, and bluebunch wheatgrass. Elevation is 4800 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 52 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 60 percent Saddle fine sandy loam on benches and 20 percent Oceanet fine sandy loam on ridge crests and shoulders of sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 15 percent Worland sandy loam on smooth ridge crests and 5 percent deep soils, otherwise similar to Saddle, on footslopes and concave surfaces. The percentage varies from one area to another.

The Saddle fine sandy loam soil is moderately deep and well drained. It formed in sandy and loamy alluvium derived dominantly from sandstone. Typically, the surface layer is pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown to brown sandy clay loam about 13 inches thick. The substratum is calcareous stratified clay loam and sandy loam about 14 inches thick over sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Saddle fine sandy loam soil is moderate. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Oceanet fine sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone. Typically, the surface layer is very pale brown fine sandy loam about 3 inches thick. The subsoil is pale brown sandy loam about 10 inches thick over calcareous sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Oceanet fine sandy loam soil is moderately rapid. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Saddle and Oceanet soils is mainly needleandthread, Indian ricegrass, big sagebrush, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre.

398--Tassel-Bowbac-Terry complex, 3 to 30 percent slopes. This map unit is on undulating to hilly uplands with some drainage dissection. Slopes are generally smooth and complex. The native vegetation is mainly big sagebrush, rubber rabbitbrush, needleandthread, bluegrama, pricklypear, and threadleaf sedge. Elevation is 4400 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 30 percent Tassel sandy loam on ridge crests and backslopes, 25 percent Bowbac fine sandy loam on sideslopes, and 25 percent Terry fine sandy loam on toeslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on ridge crests and sideslopes, 5 percent Shingle loam on knolls over soft shale, 3 percent Nelson sandy loam on sideslopes, and 2 percent Olney sandy loam on toeslopes. The percentage varies from one area to another.

The Tassel sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is light gray calcareous sandy loam about 7 inches thick over soft sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Tassel sandy loam soil is moderately rapid. Available water capacity is about ½ to 1½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Bowbac fine sandy loam soil is moderately deep and well drained. It formed in sandy and loamy alluvium and eolian deposits derived dominantly from sandstone. Typically, the surface layer is light brownish gray fine sandy loam about 5 inches thick. The subsoil is yellowish brown sandy clay loam about 12 inches thick. The substratum is calcareous sandy clay loam about 10 inches thick over sandstone bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Bowbac fine sandy loam soil is moderate. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to high.

The Terry fine sandy loam soil is moderately deep and well drained. It formed in sandy alluvium and eolian deposits derived dominantly from sandstone. Typically, the surface layer is light brownish gray fine sandy loam about 4 inches thick. The subsoil is pale brown fine sandy loam and sandy loam about 16 inches thick. The substratum is light brownish gray sandy loam about 10 inches thick over sandstone bedrock. Depth to bedrock ranges from 20 to 40 inches.

398--Continued

Permeability of the Terry fine sandy loam soil is moderately rapid. Available water capacity is about 2½ to 5 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Tassel soils is mainly needleandthread, bluebunch wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Bowbac and Terry soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

410--Bondman-Worfka-Worf complex, 0 to 15 percent slopes. This map unit is on gently sloping to rolling upland benches and sideslopes. Slopes are generally smooth to irregular and include some small depressions. The native vegetation is mainly big sagebrush, bluebunch wheatgrass, blue grama, pricklypear, Sandberg bluegrass, threadleaf sedge, and needleandthread. Elevation is 4500 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 30 percent Bondman fine sandy loam on smooth benches, 25 percent Worfka loam on smooth benches, and 25 percent Worf loam in slight depressions on benches. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Cushman loam on smooth sideslopes and fans, 5 percent Renohill clay loam in concave depressions on benches, 5 percent Tassel sandy loam and Shingle loam on crest of ridges or upper sideslopes, and 5 percent Rock outcrop on sideslopes and eroded bench lands. The percentage varies from one area to another.

The Bondman fine sandy loam soil is shallow and well drained. It formed in sandy and loamy residuum derived dominantly from sandstone and some interbedded shale. Typically, the surface layer is light brownish gray fine sandy loam about 3 inches thick. The subsoil is yellowish brown sandy clay loam about 8 inches thick. The substratum is yellowish brown very channery sandy loam about 4 inches thick over sandstone bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Bondman fine sandy loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

The Worfka loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from shale and some interbedded sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown heavy clay loam about 11 inches thick. The substratum is very pale brown calcareous sandy clay loam about 4 inches thick over shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Worfka loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

The Worf loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is brown to yellowish brown light clay loam about 7 inches thick. The substratum is very pale brown calcareous channery sandy loam about 4 inches thick over calcareous sandstone. Depth to bedrock ranges from 10 to 20 inches.

410--Continued

Permeability of the Worf loam soil is moderately slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Bondman soils is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Worfka soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Worf soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

411--Bondman-Rock outcrop-Worf complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep uplands with sandstone outcrop. Slopes are smooth to irregular and broken by bedrock exposures. The native vegetation is mainly big sagebrush, needleandthread, snakeweed, pricklypear, and bluebunch wheatgrass. Elevation is 4500 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 35 percent Bondman fine sandy loam on smooth benches, 25 percent Rock outcrop on escarpments and eroded edges, and 20 percent Worf loam on smooth benches and slight depression. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Worfka loam or clay loam on slightly concave slopes, 5 percent Renohill loam or clay loam on footslopes, 3 percent Cushman loam on smooth toeslopes and fans, and 2 percent Shingle and Tassel soils on ridge crests and knolls. The percentage varies from one area to another.

The Bondman fine sandy loam soil is shallow and well drained. It formed in sandy and loamy residuum derived dominantly from sandstone and interbedded shale. Typically, the surface layer is light brownish gray fine sandy loam about 3 inches thick. The subsoil is brown sandy clay loam about 9 inches thick over sandstone bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Bondman fine sandy loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

The Rock outcrop is dominately sandstone and some interbedded shale.

Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

The Worf loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is pale brown light clay loam about 7 inches thick. The substratum is very pale brown calcareous sandy loam about 4 inches thick over calcareous sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Worf loam soil is moderately slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Bondman soils is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

426--Larim-Larimer complex, 3 to 15 percent slopes. This map unit is on gently sloping to moderately steep high terraces. Slopes are generally smooth. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, threadleaf sedge, and Sandberg bluegrass. Elevation is 5500 to 6200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 58 degrees F, and the average frost-free period is 90 to 120 days.

This unit is 50 percent Larim gravelly loam on crests of terrace remnants and 40 percent Larimer loam on smooth terraces. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Nihill gravelly loam on terrace escarpments. The percentage varies from one area to another.

The Larim gravelly loam soil is shallow to very gravelly or very cobbly sediments and well drained. It formed in gravelly and cobbly alluvium derived dominantly from mixed sedimentary and igneous rocks. Typically, the surface layer is light brownish gray gravelly loam about 3 inches thick. The subsoil is pale brown to brown very gravelly light clay loam about 8 inches thick. The substratum is very gravelly loam about 7 inches thick over very gravelly loamy sand. Depth to loose sand and gravel ranges from 12 to 24 inches.

Permeability of the Larim gravelly loam soil is moderate through the subsoil and rapid below. Available water capacity is about 1 to 3 inches. Effective rooting depth is 12 to 24 inches. Runoff is moderate to low, and the hazard of water erosion is low. The hazard of soil blowing is low.

The Larimer loam soil is moderately deep to sand and gravel and well drained. It formed in loamy alluvium over sand and gravel derived dominantly from sedimentary and igneous rocks. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is pale brown clay loam about 8 inches thick. The substratum is calcareous pale brown light clay loam about 10 inches thick over very gravelly sand. Depth to underlying very gravelly sand ranges from 20 to 40 inches.

Permeability of the Larimer loam soil is moderate to moderately slow. Available water capacity is about 3 to 7 inches. Effective rooting depth is 20 to 20 inches. Runoff is slow, and the hazard of water erosion is low to moderate. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Larim soils is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 100 to 450 pounds per acre. The potential plant community on the Larimer soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

445--Rekop-Gystrum loams, 3 to 60 percent slopes. This map unit is on tilted bedrock ridges. Slopes are irregular and broken by incised drainages and Rock outcrop. The native vegetation is mainly bluebunch wheatgrass, blue grama, threadleaf sedge, snakeweed, and big sagebrush. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 45 percent Rekop loam on ridge crests and 35 percent Gystrum loam on backslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Neville very fine sandy loam on toeslopes and benches, 5 percent Spearfish very fine sandy loam on backslopes, and 5 percent Rock outcrop on escarpments. The percentage varies from one area to another.

The Rekop loam soil is shallow and well drained. It formed in loess-covered residuum derived dominantly from gypsiferous shale. Typically, the surface layer is light brown loam about 4 inches thick. The subsoil is pink silty clay loam about 6 inches thick over soft gypsiferous shale. Depth to gypsiferous shale bedrock ranges from 10 to 20 inches.

Permeability of the Rekop loam soil is moderate. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Gystrum loam soil is moderately deep and well drained. It formed in loess-covered residuum derived dominantly from gypsiferous shale. Typically, the surface layer is brown loam about 3 inches thick. The subsoil is pink silty clay loam about 9 inches thick. The substratum is pink silty clay loam about 14 inches thick over gypsiferous shale. Depth to gypsiferous shale bedrock ranges from 20 to 40 inches.

Permeability of the Gystrum loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing of domestic livestock and wildlife. It is also used as a source of gypsum for commercial mining.

The potential plant community on the Rekop and Gystrum soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre on Rekop and from 500 to 1100 pounds per acre on Gystrum.

446--Rock outcrop-Travessilla-Spearfish complex, 3 to 60 percent slopes. This map unit is on tilted sedimentary rock ridges. Slopes are irregular and broken by rock escarpments and dissected drainages. The native vegetation is mainly blue grama, threadleaf sedge, needleandthread, Sandberg bluegrass, and big sagebrush with scattered juniper and limber pine. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 35 percent Rock outcrop on escarpments, 25 percent Travessilla stony loam, thick solum on backslopes, and 20 percent Spearfish very fine sandy loam on broken frontslopes of escarpments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Travessilla stony loam on backslopes, 8 percent Neville very fine sandy loam on footslopes, fans, and narrow valley floors; 3 percent Tensleep loam on footslopes and in narrow valleys; 5 percent Rekop loam on sideslopes; and 4 percent Gystrum loam on sideslopes. The percentage varies from one area to another.

The Rock outcrop is fine-grained calcareous sandstone and shale.

The Travessills stony loam, thick solum, soil is shallow and well drained. It formed in loamy calcareous residuum derived dominantly from calcareous sandstone and limestone. Typically, the surface layer is light brownish gray stony loam about 3 inches thick. The subsoil is very pale brown calcareous stony loam about 12 inches thick over fractured bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Travessilla stony loam soil is moderately rapid. Available water capacity is about ½ to 2 inches. Effective rooting depth is 6 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

The Spearfish very fine sandy loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from red shale and interbedded sandstone. Typically, the surface layer is reddish brown very fine sandy loam about 2 inches thick. The subsoil is reddish brown loam about 14 inches thick over red silty shale. Depth to red shale ranges from 10 to 20 inches.

Permeability of the Spearfish very fine sandy loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

This unit is used for grazing by both domestic livestock and wildlife. Some juniper is cut for posts and firewood.

The potential plant community on the Spearfish and Travessilla soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

447--Travessilla stony loam, thick solum, 3 to 45 percent slopes. This shallow and well drained soil is on the backslopes of tilted bedrock ridges. It formed in loess and calcareous loamy residuum derived dominantly from calcareous sandstone and limestone. Slopes are dominately smooth. The native vegetation is mainly threadleaf sedge, bluebunch wheatgrass, snakeweed, and a fine scattered juniper. Elevation is 4400 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is pale brown stony loam about 3 inches thick. The subsoil is pale brown, very pale brown, and light gray calcareous stony loam about 13 inches thick over fractured bedrock. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit is about 5 percent Thedalund loam soils on backslopes and 10 percent Rock outcrop or very shallow soils on ridge crests and in dissected drainageways. Also included are small areas of Rekop, Neville, and Gystrum soils near gypsiferous shale beds. Included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Travessilla stony loam soil is moderately rapid. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on this unit is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

448--Torrifluvents saline, 0 to 6 percent slopes. This unit consists of deep, moderately well drained, saline soils on flood plains. The soils formed in stratified recent alluvial deposits derived dominantly from saline shale and sandstone. Slopes are complex. There are many vertical cut banks along the stream channel. The native vegetation is mainly greasewood with scattered rubber rabbitbrush and sagebrush, some alkali sacaton, gardner saltbush, inland saltgrass, saltcedar, basin wildrye, and plains cottonwood. Elevation is 4200 to 5500 feet. The average annual precipitation is about 7 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is fine sandy loam, sandy loam, loam, or silt loam about 10 inches thick. The underlying material to a depth of 40 to 60 inches or more is highly stratified loam, clay loam, sandy loam, fine sandy loam, and silt loam. The soils are strongly to very strongly alkaline.

Included in this unit is about 10 percent Fluvents that are not saline on flood plains close to the stream channel, 5 percent Fluvaquents on lower parts of the flood plain, and 5 percent Riverwash in the stream channel. Also included are small areas of Natrarids on the banks of some drainages. Included areas make up about 20 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Torrifluvents saline soil is moderate to slow. Available water capacity is about 5 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

This unit is used for grazing by both domestic livestock and wildlife. Some areas are being irrigated for hay production.

The potential plant communities on this variable unit include alkali sacaton, basin wildrye, western wheatgrass, Indian ricegrass, greasewood, and inland saltgrass.

449--Travessilla-Rock outcrop complex, 6 to 60 percent slopes. This map unit is on sloping to steep upland ridges formed by tilted bedrock. Slopes are generally smooth on backslopes and on bedrock escarpments. The native vegetation is mainly juniper, bluebunch wheatgrass, threadleaf sedge, snakeweed, and Sandberg bluegrass. Elevation is 4400 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 45 percent Travessilla stony loam on backslopes and 40 percent Rock outcrop on escarpments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Also included are small areas of Thedalund, Rekop, and Gystrum soils, and Travessilla soils that are 10 to 20 inches deep. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Travessilla stony loam soil is very shallow and well drained. It formed in loamy residuum derived dominantly from highly calcareous sandstone and limestone. Typically, the surface layer is light brownish gray stony loam about 3 inches thick. The subsoil is very pale brown stony loam about 3 inches thick over fractured bedrock. Depth to bedrock ranges from 4 to 10 inches.

Permeability of the Travessilla stony loam soil is moderately rapid. Available water capacity is about ¼ to 1 inch. Effective rooting depth is 4 to 10 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

The Rock outcrop is fine grain sandstone and limestone.

Runoff is very rapid, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for grazing by both domestic livestock and wildlife. Some juniper is cut for posts and firewood.

The potential plant community on the very shallow Travessilla stony loam soil is mainly bluebunch wheatgrass and curlleaf mountainmahogany. The average annual production of air-dry vegetation ranges from 250 to 500 pounds per acre.

450--Torrifluvents-Fluvaquents complex, 0 to 6 percent slopes. This map unit is on nearly level bottom lands and flood plains along the major drainageways. Slopes are smooth and slightly concave with some vertical cut banks. The native vegetation is mainly willow, basin wildrye, bluegrass, dock, wild rose, and plains cottonwood. Elevation is 5500 to 7000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 55 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 40 percent Torrifluvents on higher portions and 40 percent Fluvaquents on lower portions of the flood plain. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Riverwash in streams and channels and 10 percent Torrifluvents saline in oxbows. The percentage varies from one area to another.

The Torrifluvents are deep and moderately well drained. They formed in stratified sandy and loamy alluvium derived dominantly from sandstone and shale. The surface layer is sandy loam or loam about 10 inches thick. The underlying material to a depth of 60 inches is stratified loam, clay loam, fine sandy loam, and sandy loam. In some areas this material overlies sand and gravel.

Permeability of the Torrifluvents is moderate to moderately rapid. Available water capacity is about 5 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Fluvaquents are deep and poorly drained. They formed in stratified sandy and loamy alluvium derived dominantly from sandstone and shale. The surface layer is sandy loam or loam about 12 inches thick. The underlying material to a depth of 60 inches is stratified clay loam, loam, fine sandy loam, and sandy loam. In some areas this material overlies sand and gravel.

Permeability of the Fluvaquents is moderate to moderately slow. Available water capacity is about 6 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife. Small areas are cut for hay along some drainageways.

The potential plant communities on these variable soils include basin wildrye, western wheatgrass, bluebunch wheatgrass, needleandthread, willow, big sagebrush, rubber rabbitbrush, and plains cottonwood.

490--Shingle-Thedalund loams, 3 to 45 percent slopes. This map unit is on alluvial fans, toeslopes, ridges, and knolls. Slopes are irregular and broken to smooth. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, and needleandthread. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Shingle loam on backslopes underlain by silty shale and 35 percent Thedalund loam on toeslopes and fans. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Tassel sandy loam on crests of ridge tops and knolls, 5 percent Kim loam on footslopes and alluvial fans, 5 percent Cushman loam on footslopes and sideslopes, and 10 percent Rock outcrop. The percentage varies from one area to another.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray clay loam about 7 inches thick over soft interbedded sandstone and shale. Depth to interbedded sandstone and shale bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Thedalund loam soil is moderately deep and well drained. It formed in loess and alluvial sediments derived dominantly from mixed sandstone and silty shale. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is pale brown loam about 25 inches thick over soft interbedded sandstone and shale. Depth to interbedded sandstone and shale bedrock ranges from 20 to 40 inches.

Permeability of the Thedalund loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on these soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre on Shingle, and from 500 to 1100 pounds per acre on Thedalund.

546--Spearfish-Rock outcrop- Neville complex, 3 to 60 percent slopes. This map unit is on ridges formed by tilted, red, silty shale bedrock. Slopes are irregular and broken by escarpments and dissected by drainages. The native vegetation is mainly needleandthread, Indian ricegrass, western wheatgrass, Sandberg bluegrass, and big sagebrush. Elevation is 4300 to 5800 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 35 percent Spearfish very fine sandy loam on broken frontslopes and escarpments, 30 percent Rock outcrop on escarpments, and 20 percent Neville very fine sandy loam on fans and narrow valley bottoms. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Rekop loam on backslopes of the ridges, 5 percent Gystrum loam on backslopes, and 5 percent Tensleep loam on alluvial bottoms. The percentage varies from one area to another.

The Spearfish very fine sandy loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from red silty shale. Typically, the surface layer is reddish brown very fine sandy loam about 2 inches thick. The subsoil is reddish brown loam about 14 inches thick over red silty shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Spearfish very fine sandy loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

The Rock outcrop is red shale and sandstone.

Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

The Neville very fine sandy loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from red silty shale. Typically, the surface layer is reddish brown very fine sandy loam about 5 inches thick. The underlying material to a depth of 60 inches is reddish brown stratified silt loam and very fine sandy loam.

Permeability of the Neville very fine sandy loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Spearfish and Neville soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre on Spearfish and from 500 to 1100 pounds per acre on Neville.

572--Worland-Oceanet sandy loams, 3 to 15 percent slopes. This map unit is on undulating to rolling uplands. Slopes are generally smooth on Worland soils and irregular on Oceanet soils. The native vegetation is mainly blue grama, pricklypear, big sagebrush, needleandthread, threadleaf sedge, and Sandberg bluegrass. Elevation is 4300 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Worland sandy loam on sideslopes and footslopes and 25 percent Oceanet sandy loam on ridge crests and upper sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Persayo clay loam on ridge crests and knolls, 5 percent Pavillion loam on footslopes and fans, and 5 percent Rock outcrop on convex knolls and sideslopes of drainageways. Also included are small areas of Uffens, Mudray, and Effington Variant soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Worland sandy loam soil is moderately deep and well drained. It formed in sandy alluvium and eolian deposits derived dominantly from sandstone. Typically, the surface layer is light brownish gray and pale brown sandy loam about 8 inches thick. The subsoil is light brownish gray and light gray calcareous sandy loam about 14 inches thick over soft sandstone bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Worland sandy loam soil is moderately rapid. Available water capacity is about 2½ to 5 inches. Effective rooting depth is 20 to 40 inches. Runoff is low, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Oceanet sandy loam soil is shallow and well drained. It formed in sandy residuum derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 3 inches thick. The subsoil is pale brown sandy loam about 10 inches thick over sandstone bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Oceanet sandy loam soil is moderately rapid. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on these soils is mainly needleandthread, big sagebrush, Indian ricegrass, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre.

590--Shingle-Rock outcrop complex, 3 to 60 percent slopes. This map unit is on sloping to steep upland ridges. Slopes are smooth on backslopes and irregular and broken on escarpments. The native vegetation is mainly threadleaf sedge, blue grama, needleandthread, bluebunch wheatgrass, Sandberg bluegrass, bud sagebrush, birdfoot sagebrush, and big sagebrush. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 100 to 140 days.

This unit is 50 percent Shingle loam on backslopes and 30 percent Rock outcrop on escarpments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Thedalund loam on footslopes and fans, 5 percent Cadoma silty clay loam on footslopes, 3 percent Epsie silty clay on sideslopes, and 2 percent Tassel sandy loam on ridge crests and knolls. The percentage varies from one area to another.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is pale brown loam about 7 inches thick over soft interbedded shale and sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Rock outcrop is dominately silty shale and some interbedded sandstone.

Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Shingle soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

601--Youngston-Uffens-Glenton complex, 0 to 6 percent slopes. This map unit is on alluvial fans, footslopes, and drainage bottoms. Slopes are smooth in most areas but there are some gullies with vertical cut banks. The native vegetation is mainly big sagebrush, bluebunch wheatgrass, blue grama, and prairie junegrass with gardner saltbush on the Uffens soils. Elevation is 4300 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 35 percent Youngston loam on alluvial fans and bottoms, 30 percent Uffens very fine sandy loam on toeslopes and footslopes, and 20 percent Glenton loam on fans and drainage bottoms. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Effington silty clay loam and similar red soils with high pH on footslopes, fans, and drainage bottoms, 4 percent Effington Variant silty clay loam on footslopes below shale outcrop, 3 percent Pavillion and Persayo soils on sideslopes and crests of ridges, and 3 percent deep soils with reddish light clay loam subsoil. The percentage varies from one area to another.

The Youngston loam soil is deep and well drained. It formed in loamy alluvial sediments derived dominantly from sandstone and silty shale. Typically, the surface layer is very pale brown loam about 4 inches thick. The underlying material to a depth of 60 inches is pale brown and very pale brown stratified loam, silt loam, and very fine sandy loam.

Permeability of the Youngston loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Uffens very fine sandy loam soil is deep and well drained. It formed in strongly alkaline loamy alluvium derived dominantly from alkaline shale and sandstone. Typically, the surface layer is light gray very fine sandy loam about 3 inches thick. The subsoil is very strongly alkaline light yellowish brown sandy clay loam to pale brown loam about 10 inches thick. The substratum is stratified strongly and very strongly alkaline loam, fine sandy loam, and sandy loam to a depth of 60 inches.

Permeability of the Uffens very fine sandy loam soil is moderately slow to slow. Available water capacity is aobut 5 to 7 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderately rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Glenton loam soil is deep and well drained. It formed in stratified loamy alluvial sediments derived dominantly from sandstone and silty shale. Typically, the surface layer is pale brown loam about 4 inches thick. The underlying material to a depth of 60 inches is light brownish gray stratified sandy loam, fine sandy loam, loam, and silt loam.

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Permeability of the Glenton loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Youngston and Glenton soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and big sagebrush. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre. The potential plant community on the Uffens soil is gardner saltbush, Indian ricegrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre.

602--Binton-Uffens complex, 0 to 6 percent slopes. This map unit is on alluvial fans, footslopes, and drainage bottoms below severely eroded badland. Slopes are smooth. Some areas are cut by gullies with vertical banks. The native vegetation is mainly gardner saltbush, Indian ricegrass, bottlebrush squirreltail, blue grama, and woody aster. Elevation is 4500 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Binton loam on fans and drainage bottoms and 30 percent Uffens very fine sandy loam on fans and footslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Effington silty clay loam and similar red soils with high pH on fans and drainage bottoms, 5 percent Effington Variant silty clay loam on footslopes below shale outcrop, 3 percent Persayo clay loam and Rock outcrop on short broken slopes, and 2 percent Pavillion loam on small irregular toeslopes below Persayo soils. The percentage varies from one area to another.

The Binton loam soil is deep and well drained. It formed in strongly alkaline loamy alluvium derived dominantly from weathered shale and sandstone. Typically, the surface layer is light brownish gray loam about 3 inches thick. The underlying material to a depth of 60 inches is light gray to light brownish gray thinly stratified, highly alkaline fine sandy loam, loam, silt loam, clay loam, and silty clay loam.

Permeability of the Binton loam soil is slow. Available water capacity is about 5 to 9 inches. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Uffens very fine sandy loam soil is deep and well drained. It formed in strongly alkaline loamy alluvium derived dominantly from alkaline shale and sandstone. Typically, the surface layer is light gray very fine sandy loam about 3 inches thick. The subsoil is pale brown very strongly alkaline sandy clay loam about 9 inches thick. The substratum is stratified strongly and very strongly alkaline loam, fine sandy loam, and clay loam to a depth of 60 inches.

Permeability of the Uffens very fine sandy loam soil is moderately slow to slow. Available water capacity is about 5 to 7 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderately rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife. Some small areas are irrigated for production of hay.

The potential plant community on the Binton and Uffens soils is mainly gardner saltbush, Indian ricegrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre.

604--Effington-Effington Variant complex, 0 to 10 percent slopes. This map unit is on alluvial fans, broad valley bottoms, and footslopes. Slopes are generally smooth with some short steep slopes along drainageways. The native vegetation is mainly gardner saltbush, Indian ricegrass, bottlebrush squirreltail, woody aster, wild onion, and pricklypear. Elevation is 4500 to 5500 feet. The average annual precipitation is about 7 to 10 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Effington silt loam on fans and bottoms and 30 percent Effington Variant silty clay loam on footslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 7 percent Uffens loam or very fine sandy loam on fans, 5 percent Persayo clay loam or loam on sideslopes, 5 percent Mudray very fine sandy loam on footslopes, and 3 percent Rock outcrop on escarpments. The percentage varies from one area to another.

The Effington silt loam soil is deep and well drained. It formed in strongly alkaline fine-textured alluvium derived dominantly from alkaline shale. Typically, the surface layer is light gray weakly calcareous silt loam about 2 inches thick. The subsoil is pale brown strongly to very strongly alkaline silty clay about 11 inches thick. The substratum to a depth of 60 inches is calcareous and gypsiferous silty clay and silty clay loam. In some areas in Park County the soils are redder than typical for Effington.

Permeability of the Effington silt loam soil is slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

The Effington Variant silty clay loam soil is moderately deep and well drained. It formed in strongly alkaline fine-textured alluvium derived dominantly from alkaline shale. Typically, the surface layer is light gray and light yellowish brown silty caly loam aobut 3 inches thick. The subsoil is pale brown very strongly alkaline silty clay about 9 inches thick. The substratum is calcareous and gypsiferous silty clay and silty clay loam about 10 inches thick over weathered platy shale. Depth to bedrock ranges from 20 to 40 inches. In some areas the soil is reddish brown.

Permeability of the Effington Variant silty clay loam soil is slow to very slow. Available water capacity is about 4 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Effington and Effington Variant soils is mainly gardner saltbush, Indian ricegrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre.

606--Hoot-Rock outcrop complex, 3 to 60 percent slopes. This map unit is on sloping to steep upland ridges formed by tilted bedrock. Slopes are generally broken by bedrock exposures and drainage dissections. The native vegetation is mainly aster, threeawn, bottlebrush squirreltail, prickly-pear, prairie junegrass, and juniper. Elevation is 4500 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Hoot channery loam on backslopes and ridge tops and 35 percent Rock outcrop on escarpments and eroded benches. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Worfka channery loam on slightly concave slopes, 5 percent Tassel sandy loam on ridge crests, 3 percent Shingle loam on short convex slopes over soft shale, and 2 percent Worf soil on slightly concave slopes. Also included are small areas of Bowbac, Otero, Bondman, and Nelson soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Hoot channery loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from fine-grained sandstone. Typically, the surface layer is light gray channery loam about 2 inches thick. The subsoil is pale brown very channery clay loam about 5 inches thick. The substratum is very channery calcareous clay loam about 9 inches thick over fractured sandstone. Depth to sandstone bedrock ranges from 10 to 20 inches.

Permeability of the Hoot channery loam soil is moderately slow. The available water capacity is aobut ½ to 1 inch. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is low.

The Rock outcrop is non calcareous fine-grained sandstone.

Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife. Some juniper is cut for posts and firewood.

The potential plant community on the Hoot soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

645--Mudray-Persayo-Effington Variant complex, 3 to 30 percent slopes. This map unit is on gently sloping to moderately steep ridges and valleys. Slopes are smooth to irregular and broken by shale outcrop and drainage dissection. The native vegetation is mainly birdfoot sagebrush, bud sagebrush, gardner saltbush, blue grama, bottlebrush squirreltail, pricklypear, big sagebrush, rubber rabbitbrush, and Indian ricegrass. Elevation is 4500 to 6000 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Mudray very fine sandy loam on sideslopes and toeslopes, 25 percent Persayo clay loam on crests and sideslopes, and 15 percent Effington Variant silty clay loam on fans and toeslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 7 percent Uffens very fine sandy loam on fans, 5 percent Youngston loam on narrow valley bottoms, 5 percent Pavillion loam on sideslopes or toeslopes, and 3 percent Rock outcrop. The percentage varies from one area to another.

The Mudray very fine sandy loam soil is shallow and well drained. It formed in strongly and very strongly alkaline residuum derived dominantly from alkaline shale. Typically, the surface layer is pink very fine sandy loam about 2 inches thick. The subsoil is reddish brown very strongly alkaline sandy clay about 7 inches thick. The underlying layer is light reddish brown sandy clay loam about 6 inches thick over shale. Depth to shale ranges from 10 to 20 inches. Soils with sandy clay loam subsoil and soils lacking clay accumulation in the subsoil are grouped in this unit with Mudray very fine sandy loam.

Permeability of the Mudray very fine sandy loam soil is slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Persayo clay loam soil is shallow and well drained. It formed in residuum derived dominantly from alkaline silty shale. Typically, the surface layer is light gray light clay loam about 3 inches thick. The subsoil is light gray moderately to strongly alkaline calcareous silty clay loam about 10 inches thick over soft silty shale with gypsum crystals. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Persayo clay loam soil is moderately slow. Available water capacity is aobut 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Effington Variant silty clay loam soil is moderately deep and well drained. It formed in strongly alkaline fine-textured alluvium derived dominantly from alkaline shale. Typically, the surface layer is light gray strongly alkaline silty clay loam about 1 inch thick. The subsoil is pale

645--Continued

brown very strongly alkaline silty clay about 9 inches thick. The substratum is calcareous and gypsiferous silty clay loam and silty clay about 10 inches thick over weathered platy shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Effington Variant silty clay loam soil is slow to very slow. Available water capacity is about 4 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Mudray and Effington Variant soils is mainly gardner saltbush, Indian ricegrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre. The potential plant community on the Persayo soils is mainly gardner saltbush and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 85 to 300 pounds per acre.

650--Mudray clay loam, 0 to 15 percent slopes. This shallow and well drained soil is on upland benches and hill tops. It formed in residuum derived from highly alkaline clay shale. Slopes are smooth and slightly convex. The native vegetation is mainly birdfoot sagebrush, bottlebrush squirreltail, and gardner saltbush. Elevation is 4800 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 120 to 140 days.

Typically, the surface layer is light gray clay loam about 2 inches thick. The subsoil is brown very strongly alkaline clay about 11 inches thick over hard shale bedrock. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit is about 12 percent Worfka clay loam on gently sloping ridges and knolls. The percentage varies from one area to another.

Permeability of this Mudray clay loam soil is slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on this unit is mainly gardner saltbush, bottlebrush squirreltail, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 200 to 550 pounds per acre.

671--Rock outcrop-Persayo complex, 3 to 60 percent slopes. This map unit is on severely eroded shale uplands with broken slopes, narrow drainages, short fans, and small bench lands. Slopes are broken and irregular. The native vegetation is mainly birdfoot sagebrush, gardner saltbush, bottlebrush squirreltail, Indian ricegrass, wild onion, pricklypear, and blue grama. Elevation is 4500 to 6000 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 50 percent Rock outcrop on steep eroded escarpments and 35 percent Persayo clay loam on summits and sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Mudray very fine sandy loam on sideslopes and toeslopes, 3 percent Uffens very fine sandy loam on fans, and 2 percent Youngston loam on narrow valley bottoms. The percentage varies from one area to another.

The Rock outcrop is red, gray, and green shale.

Runoff is very high, and the hazard of water erosion is high. The hazard of soil blowing is moderate to high.

The Persayo clay loam soil is shallow and well drained. It formed in residuum derived dominantly from alkaline silty shale. Typically, the surface layer is light gray light clay loam about 3 inches thick. The subsoil is light brownish gray calcareous silty clay loam about 10 inches thick over shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Persayo clay loam soil is moderately slow. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Persayo soil is mainly gardner saltbush and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 85 to 300 pounds per acre.

675--Pavillion-Youngston loams, 0 to 15 percent slopes. This map unit is on alluvial fans, footslopes, terraces, and valley fills. Slopes are smooth. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, and prairie junegrass. Elevation is 4300 to 5500 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Pavillion loam on footslopes and fans and 35 percent Youngston loam on alluvial fans and bottoms. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Glenton loam on alluvial fans and drainage bottoms, 8 percent Uffens loam on terraces and alluvial fans, and 7 percent Effington silt loam on alluvial fans and footslopes. The percentage varies from one area to another.

The Pavillion loam soil is moderately deep and well drained. It formed in mixed loess and alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light yellowish brown loam about 5 inches thick. The subsoil is light brownish gray loam about 30 inches thick over soft fine-grained sandstone and silty shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Pavillion loam soil is moderate. Available water capacity is about 4 to 8 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate to high. The hazard of soil blowing is moderate.

The Youngston loam soil is deep and well drained. It formed in alluvial sediments derived dominantly from sandstone and silty shale. Typically, the surface layer is very pale brown loam about 4 inches thick. The underlying material to a depth of 60 inches is pale brown stratified loam, silt loam, and very fine sandy loam.

Permeability of the Youngston loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on both soils is mainly bluebunch wheatgrass, big sagebrush, needleandthread, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 225 to 600 pounds per acre.

700--Stoneham-Cushman loams, 3 to 15 percent slopes. This map unit is on alluvial fans, terraces, valley fills, and sideslopes. Slopes are smooth. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, needleandthread, and prairie junegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 50 percent Stoneham loam on fans and valley fills and 30 percent Cushman loam on sideslopes and toeslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Fort Collins loam on alluvial fans and valley fills, 5 percent Kim loam on alluvial fans and valley fills, and 5 percent Thedalund loam and Bowbac loam on footslopes and sideslopes. The percentage varies from one area to another.

The Stoneham loam soil is deep and well drained. It formed in loamy alluvial sediments derived dominantly from weathered sandstone and shale. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is light brownish gray grading to pale brown light clay loam about 10 inches thick. The underlying material to a depth of 60 inches is pale brown sandy clay loam and loam.

Permeability of the Stoneham loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Cushman loam soil is moderately deep and well drained. It formed in mixed loamy alluvial sediments derived dominantly from weathered sandstone and shale. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is pale brown light clay loam about 9 inches thick. The substratum is very pale brown calcareous clay loam and channery sandy loam about 16 inches thick over interbedded sandstone and shale. Depth to bedrock ranges from 20 tp 40 inches.

Permeability of the Cushman loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Locally some areas are irrigated for production of hay.

The potential plant community on the Stoneham and Cushman soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

701--Fort Collins-Kim loams, 3 to 15 percent slopes. This map unit is on alluvial fans, low terraces, and valley fills. Slopes are smooth with some drainage dissections. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, needleandthread, and prairie junegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 50 percent Fort Collins loam on terraces, fans, and footslopes, and 30 percent Kim loam on terraces, fans, and drainage bottoms. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 12 percent Stoneham loam on footslopes and benches, 5 percent Cushman loam on footslopes and benches, and 3 percent Absted loam on benches, footslopes, and valley fills. The percentage varies from one area to another.

The Fort Collins loam soil is deep and well drained. It formed in loamy alluvial sediments derived dominantly from weathered sandstone and shale. Typically, the surface layer is light brownish gray loam about 5 inches thick. The subsoil is pale brown loam about 13 inches thick. The substratum is light gray calcareous loam and sandy loam to a depth of 60 inches.

Permeability of the Fort Collins loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Kim loam soil is deep and well drained. It formed in loess and alluvium derived dominantly from mixed sandstone and shale. Typically, the surface layer is light brownish gray loam about 6 inches thick. The underlying material to a depth of 60 inches is light brownish gray loam with lenses of silt loam.

Permeability of the Kim loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Some areas are irrigated for hay and pasture.

The potential plant community on the Fort Collins and Kim soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

702--Absted-Fort Collins loams, 3 to 15 percent slopes. This map unit is on alluvial fans, terraces, footslopes, and valley fills. Slopes are smooth. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, needleandthread, and prairie junegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Absted loam on terraces and valley fills, and 35 percent Fort Collins loam on terraces, footslopes, and fans. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Stoneham loam on footslopes and valley fills, 5 percent Arvada loam on terraces and valley fills, 3 percent Cushman loam on footslopes and fans, and 2 percent Renohill loam on footslopes and sideslopes. The percentage varies from one area to another.

The Absted loam soil is very deep and well drained. It formed in moderately fine-textured alluvium derived dominantly from sandstone and shale. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is light brownish gray heavy clay loam about 17 inches thick. The substratum is light brownish gray clay loam to a depth of about 60 inches. The lower subsoil is strongly or very strongly alkaline.

Permeability of the Absted loam soil is moderately slow to slow. Available water capacity is about 6 to 10 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Fort Collins loam soil is deep and well drained. It formed in loamy alluvial sediments derived dominantly from weathered sandstone and shale. Typically, the surface layer is light brownish gray loam about 5 inches thick. The subsoil is brown grading with depth to pale brown light clay loam about 20 inches thick. The substratum is pale brown loam to a depth of 60 inches.

Permeability of the Fort Collins loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Absted and Fort Collins soils is mainly bluebunch wheatgrass, thickspike and western wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

703--Fort Collins-Cushman loams, 3 to 15 percent slopes. This map unit is on alluvial fans, terraces, footslopes, and sideslopes. Slopes are smooth. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, needleandthread, and prairie junegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 50 percent Fort Collins loam on terraces, fans, and footslopes, and 30 percent Cushman loam on sideslopes and toeslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Stoneham loam on footslopes and valley fills, 5 percent Absted loam on alluvial fans and benches, and 5 percent Bowbac sandy loam on alluvial fans and sideslopes. The percentage varies from one area to another.

The Fort Collins loam soil is deep and well drained. It formed in loamy alluvial sediments derived dominantly from weathered sandstone and shale. Typically, the surface layer is light brownish gray loam about 5 inches thick. The subsoil is brown grading with depth to pale brown clay loam about 20 inches thick. The substratum is pale brown loam to a depth of 60 inches.

Permeability of the Fort Collins loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Cushman loam soil is moderately deep and well drained. It formed in loamy alluvial sediments derived dominantly from weathered sandstone and shale. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is pale brown light clay loam about 16 inches thick over interbedded sandstone and shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Cushman loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Some areas are irrigated for production of hay.

The potential plant community on the Fort Collins and Cushman soils is mainly bluebunch wheatgrass, thickspike and western wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

705--Kim-Thedalund loams, 3 to 15 percent slopes. This map unit is on alluvial fans, terraces, and valley fills. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, and needleandthread. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 50 percent Kim loam on terraces, footslopes, and drainage bottoms, and 30 percent Thedalund loam on toeslopes and fans. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 7 percent Cushman loam on footslopes and lower sideslopes, 7 percent Stoneham loam on footslopes and lower sideslopes, 3 percent Tassel sandy loam on crests, shoulders, and sideslopes of knolls and ridges, and 3 percent Shingle loam on crests, shoulders, and sideslopes of knolls and ridges. The percentage varies from one area to another.

The Kim loam soil is deep and well drained. It formed in loess and alluvial sediments derived dominantly from sandstone and silty shale. Typically, the surface layer is brown and light brownish gray loam about 5 inches thick. The underlying material to a depth of 60 inches is light brownish gray pale brown and brown loam.

Permeability of the Kim loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Thedalund loam soil is moderately deep and well drained. It formed in loess and alluvial sediments derived dominantly from sandstone and silty shale. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray light silty clay loam about 24 inches thick over soft interbedded sandstone and shale. Depth to soft interbedded sandstone and shale bedrock ranges from 20 to 40 inches.

Permeability of the Thedalund loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife. Some areas are irrigated for hay and pasture.

The potential plant community on the Kim soils is mainly bluebunch wheatgrass, thickspike and western wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre. The potential plant community on the Thedalund soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

706--Cushman-Terry-Worf complex, 3 to 20 percent slopes. This map unit is on terraces, footslopes, sideslopes, and summits of upland ridges. Slopes are smooth to irregular. The native vegetation is mainly big sagebrush, blue grama, bluebunch wheatgrass, needleandthread, and prairie junegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 35 percent Cushman loam on lower sideslopes, footslopes, and terraces, 25 percent Terry sandy loam on narrow ridge tops, knolls, and shoulders of ridges, and 20 percent Worf loam on benches and crests. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Bowbac sandy loam on lower sideslopes and footslopes, 5 percent Tassel sandy loam on narrow ridge tops and knolls, and 5 percent Shingle loam on summits and shoulders of ridges and knolls. The percentage varies from one area to another.

The Cushman loam soil is moderately deep and well drained. It formed in loamy alluvium derived dominantly from weathered sandstone and shale. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is pale brown light silty clay loam about 9 inches thick. The substratum is very pale brown calcareous clay loam and channery sandy loam about 16 inches thick over interbedded sandstone and shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Cushman loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Terry sandy loam soil is moderately deep and well drained. It formed in moderately coarse-textured calcareous sediments derived dominantly from sandstone. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is pale brown fine sandy loam about 10 inches thick. The substratum is light brownish gray calcareous fine sandy loam about 10 inches thick over bedrock. Depth to sandstone bedrock ranges from 20 to 40 inches.

Permeability of the Terry sandy loam is moderately rapid. Available water capacity is about 2½ to 5 inches. Effective rooting depth is 20 to 40 inches. Runoff is low, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Worf loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone and shale. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is pale brown light clay loam about 7 inches thick. The substratum is very pale brown calcareous channery sandy loam about 4 inches thick over calcareous sandstone. Depth to bedrock ranges from 10 to 20 inches.

706--Continued

Permeability of the Worf loam soil is moderately slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Cushman and Worf soils is mainly bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre on Cushman and from 350 to 700 pounds per acre on Worf. The potential plant community on the Terry soil is mainly needleandthread and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

708--Renohill-Cushman-Worfka complex, 3 to 20 percent slopes. This map unit is on benches of residual uplands. Slopes are smooth. The native vegetation is mainly western wheatgrass, prairie junegrass, needleandthread, and big sagebrush. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Renohill clay loam on upland benches, 20 percent Cushman loam on sideslopes, and 20 percent Worfka loam on upland benches. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Worf loam on upland benches and 5 percent Cadoma silty clay loam on sideslopes and toeslopes. Also included are small areas of Shingle soils and Rock outcrop. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Renohill clay loam soil is moderately deep and well drained. It formed in fine-textured alluvium and residuum derived dominantly from clay shale. Typically, the surface layer is light brownish gray to pale brown clay loam about 4 inches thick. The subsoil is yellowish brown and pale brown clay about 12 inches thick. The substratum is light yellowish brown sandy clay loam about 8 inches thick over clayey shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Renohill clay loam soil is slow. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Cushman loam soil is moderately deep and well drained. It formed in loamy alluvium and loess derived dominantly from interbedded shale and sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is pale brown, yellowish brown, and light yellowish brown light clay loam about 15 inches thick. The substratum is very pale brown calcareous channery sandy loam about 6 inches thick over soft sandstone and shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Cushman loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Worfka loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from interbedded shale and some sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown heavy clay loam about 11 inches thick. The substratum is very pale brown calcareous sandy clay loam about 4 inches thick over shale and sandstone. Depth to bedrock ranges from 10 to 20 inches.

708--Continued

Permeability of the Worfka loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Renohill and Worfka soils is mainly bluebunch wheatgrass, thickspike and western wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre on Renohill and from 350 to 700 pounds per acre on Worfka. The potential plant community on the Cushman soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

709--Renohill-Cadoma-Worfka complex, 0 to 20 percent slopes. This map unit is on upland ridges. Slopes are smooth and complex. The native vegetation is mainly big sagebrush, blue grama, western wheatgrass, and Sandberg bluegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Renohill clay loam on ridge tops, sideslopes, and narrow drainage bottoms, 25 percent Cadoma silty clay loam on backslopes and footslopes, and 20 percent Worfka loam on ridge crests and shoulders. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Cushman loam on backslopes and footslopes, 3 percent Worf loam on narrow ridge tops and shoulders, and 2 percent Ulm loam along drainageways. The percentage varies from one area to another.

The Renohill clay loam soil is moderately deep and well drained. It formed in clayey alluvium and residuum derived dominantly from clay shale. Typically, the surface layer is light brownish gray clay loam about 4 inches thick. The subsoil is pale brown clay about 12 inches thick. The substratum is light yellowish brown light clay loam about 8 inches thick over interbedded shale and sandstone. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Renohill clay loam soil is slow. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in strongly to very strongly alkaline loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Typically, the surface layer is very pale brown strongly alkaline silty clay loam about 4 inches thick. The subsoil is pale brown very strongly alkaline silty clay loam about 14 inches thick. The substratum is light gray strongly alkaline silty clay loam about 12 inches thick over gypsiferous shale. Depth to underlying clay shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Worfka loam soil is shallow and well drained. It formed in fine-textured residuum derived from interbedded shale and some sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown heavy clay loam about 11 inches thick. The substratum is very pale brown calcareous sandy clay loam about 4 inches thick over shale and sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Worfka loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

709--Continued

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Renohill and Worfka soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre on Renohill and from 350 to 700 pounds per acre on Worfka. The potential plant community on the Cadoma soil is gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

710--Cadoma-Renohill-Ulm complex, 3 to 20 percent slopes. This map unit is on undulating to hilly upland benches and dissected uplands. Slopes are generally smooth and complex. The native vegetation is mainly birdfoot sagebrush, big sagebrush, Indian ricegrass, bluebunch wheatgrass, western wheatgrass, blue grama, and pricklypear. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 40 percent Cadoma silty clay loam on footslopes, 25 percent Renohill clay loam on sideslopes, and 20 percent Ulm loam on footslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 8 percent Worfka loam or clay loam on bench tops, 3 percent Cushman loam on footslopes, 2 percent Shingle loam on upper sideslopes, and 2 percent Rock outcrop on steep broken slopes. The percentage varies from one area to another.

The Cadoma silty clay loam soil is moderately deep and well drained. It formed in strongly alkaline loess and fine-textured alluvium derived dominantly from calcareous and gypsiferous shale. Typically, the surface layer is light gray strongly alkaline silty clay loam about 4 inches thick. The subsoil is pale brown very strongly alkaline silty clay loam about 14 inches thick. The substratum is pale brown strongly alkaline silty clay loam about 12 inches thick over gypsiferous clay shale. Depth to underlying clay shale ranges from 20 to 40 inches.

Permeability of the Cadoma silty clay loam soil is slow. Available water capacity is about 2 to 4 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

Renohill clay loam soil is moderately deep and well drained. It formed in clayey alluvium and residuum derived dominantly from calcareous shale and interbedded sandstone. Typically, the surface layer is light brownish gray clay loam about 4 inches thick. The subsoil is pale brown heavy clay loam about 12 inches thick. The substratum is light yellowish brown clay loam about 8 inches thick over shale and soft sandstone bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Renohill clay loam soil is slow. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Ulm loam soil is deep and well drained. It formed in calcareous fine-textured alluvium derived dominantly from clay shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 5 inches thick. The subsoil is light yellowish brown heavy clay loam about 10 inches thick. The substratum is very pale brown calcareous clay loam and sandy clay loam to a depth of 60 inches.

710--Continued

Permeability of the Ulm loam soil is moderately slow to slow. Available water capacity is about 8 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Cadoma silty clay loam soil is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre. The potential plant community on the Renohill and Ulm soils is mainly thickspike and western wheatgrass, bluebunch wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

720--Blazon-Rock outcrop complex, 3 to 60 percent slopes. This map unit is on gently sloping to steep hills. Slopes are irregular and broken by Rock outcrop escarpments. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, needleandthread, lupine, big sagebrush, juniper, and limber pine. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 45 percent Blazon loam on rounded ridge tops and sideslopes, and 30 percent Rock outcrop on escarpments and eroded ridges and knolls. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 7 percent Diamondville loam on toeslopes, 8 percent very shallow sandy Torriorthents on crests and south or west-facing sideslopes, and 5 percent Delphill loam on footslopes and narrow drainage bottoms. Also included are small areas of Brownsto soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Blazon loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from soft loamy shale and interbedded sandstone. Typically, the surface layer is brown loam about 3 inches thick. The subsoil is very pale brown calcareous loam about 12 inches thick. Depth to soft interbedded sandstone and shale ranges from 10 to 20 inches.

Permeability of the Blazon loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Rock outcrop is fine-grained sandstone and loamy shale; in some areas it is conglomerate.

Runoff is very rapid, and the hazard of water erosion is very low. The hazard of soil blowing is very low.

This unit is used for grazing by both domestic livestock and wildlife. Some juniper and limber pine is cut for firewood or posts.

The potential plant community on the Blazon loam soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

722--Blazon loam, 3 to 45 percent slopes. This shallow and well drained soil is on gently sloping to steep hills and ridges. It formed in loamy residuum derived dominantly from soft loamy shale and interbedded sandstone. Slopes are complex and in some areas are broken by bedrock escarpments. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, needleandthread, Indian ricegrass, lupine, big sagebrush, rabbitbrush, juniper, and limber pine. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 110 days.

Typically, the surface layer is brown loam about 3 inches thick. The subsoil is very pale brown calcareous loam about 12 inches thick over bedrock. Depth to soft shale and sandstone ranges from 10 to 20 inches.

Included in this unit is about 8 percent Rock outcrop, 5 percent Brownsto gravelly loam on crests and sideslopes, 4 percent Delphill loam on footslopes and drainage bottoms, and 3 percent very shallow Torriorthents on ridge crests and south and west-facing sideslopes. The percentage varies from one area to another.

Permeability of this Blazon loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on this unit is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

723--Blazon-Delphill loams, 3 to 30 percent slopes. This map unit is on gently sloping to moderately steep hills. Slopes are smooth. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, needleandthread, lupine, big sagebrush, juniper, and rabbitbrush. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 40 percent Blazon loam on ridge tops and sideslopes, and 35 percent Delphill loam on sideslopes and toeslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Diamondville loam on sideslopes and footslopes, 10 percent Rock outcrop on ridge crests and eroded shoulders, and 5 percent Forelle loam on toeslopes and narrow drainageways. The percentage varies from one area to another.

The Blazon loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from soft loamy shale and interbedded sandstone. Typically, the surface layer is brown loam about 3 inches thick. The subsoil is light yellowish brown and very pale brown calcareous loam about 13 inches thick over bedrock. Depth to soft interbedded sandstone and shale ranges from 10 to 20 inches.

Permeability of the Blazon loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Delphill loam soil is moderately deep and well drained. It formed in mixed alluvium loess and residuum derived dominantly from interbedded sandstone and siltstone. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is light brownish gray to light gray calcareous loam about 33 inches thick over bedrock. Depth to interbedded sandstone and shale ranges from 20 to 40 inches.

Permeability of the Delphill loam soil is moderate. Available water capacity is about 3 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Blazon soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Delphill soil is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

724--Blazon-Brownsto complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep hill summits and sideslopes. Slopes are smooth. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, needleandthread, lupine, and sagebrush. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 110 days.

This unit is 40 percent Blazon loam on ridge tops and sideslopes, and 35 percent Brownsto gravelly loam on summits and sideslopes of ridges formed by conglomerate bedrock. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent very shallow Torriorthents on crests, shoulders, and south and west-facing sideslopes, 5 percent Rock outcrop on escarpments and eroded ridge tops, 5 percent Forelle loam on toeslopes and narrow drainageways, and 5 percent Delphill loam on lower sideslopes and footslopes. The percentage varies from one area to another.

The Blazon loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from soft loamy shale and interbedded sandstone. Typically, the surface layer is brown loam about 3 inches thick. The subsoil is very pale brown calcareous loam about 12 inches thick over bedrock. Depth to soft interbedded sandstone and shale ranges from 10 to 20 inches.

Permeability of the Blazon loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Brownsto gravelly loam soil is very deep and well drained. It formed in gravelly and cobbly calcareous loamy alluvium derived dominantly from conglomerate or glacial outwash. Typically, the surface layer is pale brown gravelly loam about 9 inches thick. The subsoil is white very gravelly calcareous loam to a depth of 60 inches.

Permeability of the Brownsto gravelly loam soil is moderately rapid. Available water capacity is about 4 to 7 inches. Effective rooting depth is less than 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. Rooting depth is limited by high content of carbonates and rock fragments.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Blazon and Brownsto soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

725--Blazon-Diamondville loams, 3 to 30 percent slopes. This map unit is on gently sloping to moderately steep foot hills and ridges. Slopes are smooth. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, needleandthread, lupine, big sagebrush, and rabbitbrush. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 40 percent Blazon loam on crest of ridges and sideslopes, and 35 percent Diamondville loam on sideslopes and toeslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Delphill loam on footslopes and narrow bottoms, 10 percent Forelle loam on toeslopes, and 5 percent Rock outcrop on eroded ridge crests and escarpments. The percentage varies from one area to another.

The Blazon loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from soft loamy shale and interbedded sandstone. Typically, the surface layer is brown loam about 3 inches thick. The subsoil is very pale brown calcareous loam about 12 inches thick over bedrock. Depth to soft interbedded shale and sandstone ranges from 10 to 20 inches.

Permeability of the Blazon loam soil is moderate. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Diamondville loam soil is moderately deep and well drained. It formed in mixed alluvium, loess, and residuum derived dominantly from interbedded sandstone, loamstone, and shale. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is brown clay loam about 9 inches thick. The substratum is pale brown loam about 14 inches thick over calcareous sandstone and loamstone. Depth to interbedded loamstone and sandstone ranges from 20 to 40 inches.

Permeability of the Diamondville loam soil is moderate. Available water capacity is about 3 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Blazon and Diamondville soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre on Blazon and from 500 to 1100 pounds per acre on Diamondville.

730--Forelle-Diamondville loams, 3 to 15 percent slopes. This map unit is on gently sloping to sloping footslopes, alluvial fans, and lower sideslopes. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, needleandthread, Canby bluegrass, lupine, pussytoes, phlox, and big sagebrush. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 45 percent Forelle loam on terraces, fans, and toeslopes, and 35 percent Diamondville loam on sideslopes and toeslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Delphill loam on footslopes and lower interfluves, 5 percent Blazon loam on crests of interfluves on footslopes, and 5 percent Patent loam on alluvial fans and drainage bottoms. The percentage varies from one area to another.

The Forelle loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from sandstone and shale. Typically, the surface layer is pale brown loam about 4 inches thick. The subsoil is yellowish brown loam about 26 inches thick. The substratum is light yellowish brown calcareous loam about 30 inches thick.

Permeability of the Forelle loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is low to moderate. The hazard of soil blowing is moderate.

The Diamondville loam soil is moderately deep and well drained. It formed in mixed alluvium, loess, and residuum derived dominantly from interbedded sandstone, loamstone, and shale. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is brown clay loam and loam about 9 inches thick. The substratum is pale brown calcareous loam about 14 inches thick over calcareous sandstone and loamstone. Depth to interbedded loamstone and sandstone ranges from 20 to 40 inches.

Permeability of the Diamondville loam soil is moderate. Available water capacity is about 3 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Diamondville and Forelle soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

732--Thermopolis-Rock outcrop complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep sideslopes and ridges. Slopes are irregular and broken by Rock outcrop escarpments. The native vegetation is mainly needleandthread, Indian ricegrass, Sandberg bluegrass, western wheatgrass, rabbitbrush, and big sagebrush. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 40 percent Thermopolis loam on sideslopes and 35 percent Rock outcrop on eroded ridge crests and escarpments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 14 percent Blazon loam on ridge crests and sideslopes and 11 percent Delphill loam on footslopes and crests of lower interfluves. The percentage varies from one area to another.

The Thermopolis loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from reddish calcareous siltstone and shale. Typically, the surface layer is light brown loam about 4 inches thick. The subsoil is light reddish brown loam about 6 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Thermopolis silt loam soil is moderately slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is moderate.

The Rock outcrop is shale and siltstone.

Runoff is very rapid, and the hazard of water erosion is very low. The hazard of soil blowing is very low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Thermopolis soil is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

735--Patent-Forelle association, gently sloping and sloping. This map unit is on alluvial fans and bottoms. Slope is 3 to 15 percent. Slopes are smooth. The native vegetation is mainly western wheatgrass, Sandberg bluegrass, big sagebrush, rabbitbrush, and lupine. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 45 percent Patent loam on footslopes and alluvial bottoms and 35 percent Forelle loam on fans.

Included in this unit is about 10 percent Pinelli loam on bottoms and fans, 5 percent Diamondville loam on toeslopes, and 5 percent Delphill loam on footslopes and crests of lower interfluves. The percentage varies from one area to another.

The Patent loam soil is deep and well drained. It formed in mixed loess and loamy alluvium derived dominantly from interbedded shale and sandstone. Typically, the surface layer is light brownish gray loam about 2 inches thick. The underlying material to a depth of 60 inches is light brownish gray to pale brown loam and very fine sandy loam.

Permeability of the Patent loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is low to moderate. The hazard of soil blowing is moderate.

The Forelle loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from weathered sedimentary bedrock. Typically, the surface layer is pale brown loam about 4 inches thick. The subsoil is yellowish brown clay loam about 12 inches thick. The underlying material to a depth of 60 inches is light yellowish brown to yellowish brown calcareous loam.

Permeability of the Forelle loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is low to moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Forelle and Patent soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

736--Forelle-Pinelli loams, 3 to 15 percent slopes. This map unit is on gently sloping to sloping alluvial fans and bottoms. Slopes are smooth. The native vegetation is mainly western wheatgrass, Sandberg bluegrass, big sagebrush, rubber rabbitbrush, and lupine. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 50 percent Forelle loam on benches, fans, and toeslopes, and 30 percent Pinelli loam on narrow valley bottoms and fans. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Patent loam on bottoms, 5 percent Diamondville loam on footslopes and lower interfluves, and 5 percent Delphill loam on footslopes and narrow bottoms. The percentage varies from one area to another.

The Forelle loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from sedimentary sandstone and shale. Typically, the surface layer is pale brown loam about 4 inches thick. The subsoil is yellowish brown clay loam about 12 inches thick. The substratum is light yellowish brown loam to a depth of 60 inches.

Permeability of the Forelle loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is low to moderate. The hazard of soil blowing is moderate.

The Pinelli loam soil is deep and well drained. It formed in mixed moderately fine-textured alluvium derived dominantly from shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is pale brown, brown, and very pale brown silty clay loam and clay loam about 28 inches thick. The underlying material to a depth of 60 inches is very pale brown silt loam.

Permeability of the Pinelli loam soil is moderately slow. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Forelle and Pinelli soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

737--Forelle-Alcova loams, 3 to 15 percent slopes. This map unit is on gently sloping to sloping alluvial fans and terraces. Slopes are smooth and slightly concave. The native vegetation is mainly Idaho fescue, needle-andthread, Sandberg bluegrass, fringed sagewort, phlox, and big sagebrush. Elevation is 6000 to 7200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 45 to 53 degrees F, and the average frost-free period is 60 to 120 days.

This unit is 40 percent Forelle loam on benches, fans, terraces, and toeslopes, and 35 percent Alcova loam on terraces and fans. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 11 percent Blazon loam on sideslopes and shoulders of ridges, 9 percent Delphill loam on footslopes and fans, and 5 percent Rock outcrop on escarpments. The percentage varies from one area to another.

The Forelle loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from sandstone and shale. Typically, the surface layer is pale brown loam about 4 inches thick. The subsoil is yellowish brown clay loam about 12 inches thick. The substratum is light yellowish brown calcareous loam to a depth of 60 inches.

Permeability of the Forelle loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low, and the hazard of water erosion is low to moderate. The hazard of soil blowing is moderate.

The Alcova loam soil is very deep and well drained. It formed in loamy alluvium or very gravelly and cobbly deposits derived dominantly from sedimentary and igneous rock. Typically, the surface layer is light brownish gray loam about 3 inches thick. The subsoil is grayish brown and brown clay loam and sandy clay loam about 22 inches thick. The underlying material to a depth of 60 inches is calcareous very gravelly sandy loam. Depth to very gravelly sandy loam ranges from 20 to 40 inches.

Permeability of the Alcova loam soil is moderate. Available water capacity is about 3 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is low to moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Forelle and Alcova soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

749--Renohill-Worfka complex, 0 to 20 percent slopes. This map unit is on nearly level to moderately steep hills and ridges. Slopes are smooth. The native vegetation is mainly big sagebrush, blue grama, western wheatgrass, and Sandberg bluegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Renohill clay loam on backslopes, sideslopes, and footslopes, and 35 percent Worfka loam on sideslopes, backslopes, and summits. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Samsil clay on crests and shoulders of ridges, 2 percent Shingle loam on shoulders of ridges, 3 percent Cushman loam on sideslopes and footslopes, 5 percent Worf loam on crests and shoulders of knolls and ridges, and 5 percent Rock outcrop on escarpments. The percentage varies from one area to another.

The Renohill clay loam soil is moderately deep and well drained. It formed in fine-textured alluvium and residuum derived dominantly from clay shale. Typically, the surface layer is light brownish gray clay loam about 4 inches thick. The subsoil is pale brown heavy clay loam about 12 inches thick. The substratum is light yellowish brown sandy clay loam about 8 inches thick over sedimentary bedrock. Depth to clay shale bedrock ranges from 20 to 40 inches.

Permeability of the Renohill clay loam soil is slow. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Worfka loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from interbedded sandstone and shale. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown heavy clay loam about 11 inches thick. The substratum is very pale brown calcareous sandy clay loam about 4 inches thick over calcareous sandstone and shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Worfka loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Renohill and Worfka soils is mainly bluebunch wheatgrass, thickspike and western wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre on Renohill and from 350 to 700 pounds per acre on Worfka.

750--Worfka-Cushman association, gently sloping and steep. This map unit is on upland benches and sideslopes. Slope is 3 to 20 percent. Slopes are smooth. The native vegetation is mainly bluebunch wheatgrass, blue grama, big sagebrush, and pricklypear. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Worfka loam on benches and 30 percent Cushman loam on sideslopes.

Included in this unit is about 5 percent Samsil clay on toeslopes, 5 percent Rock outcrop on ridges and escarpments, 5 percent Thedalund loam on toeslopes and fans, and 5 percent Renohill clay loam on upland benches. The percentage varies from one area to another.

The Worfka loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from interbedded sandstone and shale. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown heavy clay loam about 11 inches thick. The substratum is brown clay loam and very pale brown calcareous sandy clay loam about 4 inches thick over calcareous sandstone and shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Worfka loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

The Cushman loam soil is moderately deep and well drained. It formed in loamy alluvium and loess derived dominantly from interbedded shale and sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown light clay loam about 9 inches thick. The substratum is light yellowish brown calcareous clay loam and channery sandy loam about 16 inches thick over soft sandstone and shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Cushman loam soil is moderate. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Worfka soils is mainly bluebunch wheatgrass, needleandthread, thickspike and western wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Cushman soils is mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre.

751--Worfka-Shingle-Rock outcrop complex, 3 to 45 percent slopes. This map unit is on upland ridges and hills. Slopes are irregular and broken by Rock outcrop. The native vegetation is mainly big sagebrush, blue grama, western wheatgrass, and Sandberg bluegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 55 degrees F, and the average frost-free period is 110 to 140 days.

This unit is 45 percent Worfka loam on backslopes and sideslopes, 20 percent Shingle loam on sideslopes, and 15 percent Rock outcrop on escarpments and eroded ridge crests. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Renohill clay loam on footslopes, 7 percent Tassel sandy loam on ridges and crests over sandstone, and 8 percent Cadoma silty clay loam on footslopes and sideslopes. The percentage varies from one area to another.

The Worfka loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from interbedded shale and sandstone. Typically, the surface layer is pale brown loam about 3 inches thick. The subsoil is yellowish brown heavy clay loam and brown clay loam about 11 inches thick. The substratum is very pale brown calcareous sandy clay loam about 4 inches thick over sandstone and shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Worfka loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate to low.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is pale brown loam about 7 inches thick over soft interbedded sandstone and shale. Depth to underlying bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Rock outcrop is interbedded sandstone and shale.

Runoff is very rapid, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Worfka soils is mainly bluebunch wheatgrass, thickspike and western wheatgrass, needleandthread, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Shingle soils is

751--Continued

mainly bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

752--Epsie silty clay, 3 to 15 percent slopes. This shallow and well drained soil is on ridges and knolls in clay shale uplands. It formed in residuum derived dominantly from soft gypsiferous shale. Slopes are smooth. The native vegetation is mainly gardner saltbush, birdfoot sagebrush, bottlebrush squirreltail, and Indian ricegrass. Elevation is 4300 to 6000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 110 to 140 days.

Typically, the surface layer is light brownish gray silty clay about 3 inches thick. The subsoil is grayish brown silty clay about 13 inches thick over soft clayey gypsiferous shale. Depth to clay shale ranges from 10 to 20 inches.

Included in this unit is about 10 percent Cadoma silty clay loam on ridge tops, and 5 percent Orella silty clay on crests and sideslopes. The percentage varies from one area to another.

Permeability of this Epsie silty clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. This soil is subject to piping. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on this unit is mainly gardner saltbush. The average annual production of air-dry vegetation ranges from 275 to 650 pounds per acre.

753--Gaynor-Samsil clays, 3 to 15 percent slopes. This map unit is on undulating to rolling uplands. Slopes are smooth and convex. The native vegetation is mainly western wheatgrass, big sagebrush, and prairie junegrass. Elevation is 4500 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 40 percent Gaynor clay on footslopes and broad ridge tops and 40 percent Samsil clay on ridge crests and sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on ridges and escarpments, 5 percent Renohill clay loam on toeslopes and upland benches, and 5 percent Orella silty clay on summits and sideslopes. The percentage varies from one area to another.

The Gaynor clay soil is moderately deep and well drained. It formed in clayey alluvium and residuum derived dominantly from dark clay shale. Typically, the surface layer is grayish brown clay about 4 inches thick. The subsoil is grayish brown clay about 22 inches thick over dark shale. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Gaynor clay soil is slow to very slow. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Samsil clay soil is shallow and well drained. It formed in clayey residuum derived dominantly from dark clay shale. Typically, the surface layer is grayish brown clay about 1 inch thick. The subsoil is grayish brown to brown clay about 15 inches thick over dark clay shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Samsil clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Gaynor and Samsil soils is mainly thickspike and western wheatgrass, bluebunch wheatgrass, and Indian ricegrass. The average annual production of air-dry vegetation ranges from 500 to 1100 pounds per acre on Gaynor and from 350 to 700 pounds per acre on Samsil.

802--Rock outcrop-Starman complex, 6 to 60 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are irregular and broken by bedrock outcrop and escarpments. The native vegetation is mainly Idaho fescue, lupine, fringed sagewort, rubber rabbitbrush, scattered limber pine, and deathcamas. Elevation is 7200 to 9400 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 50 percent Rock outcrop on eroded ridge tops and escarpments and 40 percent Starman gravelly loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 6 percent Starley loam on slightly concave sideslopes and 4 percent Bachus loam on toeslopes and drainage bottoms. The percentage varies from one area to another.

The Rock outcrop is limestone or calcareous sandstone.

Runoff is very rapid, and the hazard of water erosion is very low. The hazard of soil blowing is very low.

The Starman gravelly loam soil is very shallow and well drained. It formed in calcareous loamy residuum derived dominantly from limestone or highly calcareous sandstone. Typically, the surface layer is grayish brown gravelly loam about 3 inches thick. The subsoil is light brownish gray strongly calcareous very gravelly loam about 6 inches thick over fractured highly calcareous sandstone. Depth to bedrock ranges from 4 to 10 inches.

Permeability of the Starman gravelly loam soil is moderate. Available water capacity is about ½ to 1 inch. Effective rooting depth is 4 to 10 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The potential plant community on the Starman soil is mainly Columbia needlegrass, bluebunch wheatgrass, and mountainmahogany. The average annual production of air-dry vegetation ranges from 400 to 800 pounds per acre.

804--Rock outcrop-Merino complex, 6 to 60 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are generally smooth but some areas are broken by Rock outcrop and escarpments. The native vegetation is mainly Idaho fescue, Canby bluegrass, lupine, bluebunch wheatgrass, and big sagebrush. Elevation is 7200 to 10,000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 45 percent Rock outcrop on eroded ridge tops and escarpments and 35 percent Merino gravelly sandy clay loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Nielsen channery loam on crests of ridges and slightly concave sideslopes and 5 percent Nielsen Variant clay loam on ridge crests and concave sideslopes. Also included are small areas of Gilispie, Bachus, Slipman, and Wetterhorn Variant soils. These included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Rock outcrop is fine-grained sandstone, mudstone, and andesite.

Runoff is very rapid, and the hazard of water erosion is very low. The hazard of soil blowing is very low.

The Merino gravelly sandy clay loam soil is dominantly shallow and well drained. It formed in noncalcareous residuum derived dominantly from fine-grained sandstone, mudstone, and andesite. Typically, the surface layer is light brownish gray gravelly and very gravelly sandy clay loam about 9 inches thick. The subsoil is pale brown very gravelly clay loam about 6 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Merino gravelly sandy clay loam soil is moderate. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is moderate.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Merino soil is mainly Columbia needlegrass, Idaho fescue, spike-fescue, and bluebunch wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre.

806--Starley-Starman-Rock outcrop complex, 6 to 60 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are smooth to irregular and some areas are broken by bedrock outcrop. The native vegetation is mainly Idaho fescue, lupine, fringed sagewort, rubber rabbitbrush, big sagebrush, scattered limber pine, and some deathcamas. Elevation is 7200 to 9400 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 50 percent Starley loam on sideslopes and ridges, 20 percent Starman gravelly loam on sideslopes and ridge crests, and 15 percent Rock outcrop on eroded ridge tops and escarpments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Bachus loam on toeslopes, small depressions, and narrow drainage bottoms. Also included are small areas of Nielsen Variant, Wix, and Judkins soils. These included areas make up about 5 percent of the total acreage. The percentage varies from one area to another.

The Starley loam soil is shallow and well drained. It formed in calcareous loamy residuum derived dominantly from highly calcareous sandstone and limestone. Typically, the surface layer is dark gray loam about 8 inches thick. The subsoil is light gray very gravelly loam about 11 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Starley loam soil is moderate. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Starman gravelly loam soil is very shallow and well drained. It formed in calcareous loamy residuum derived dominantly from calcareous sandstone and limestone. Typically, the surface layer is grayish brown gravelly loam about 3 inches thick. The subsoil is light brownish gray strongly calcareous very gravelly loam about 6 inches thick over bedrock. Depth to bedrock ranges from 4 to 10 inches.

Permeability of the Starman gravelly loam soil is moderate. Available water capacity is about ½ to 1 inch. Effective rooting depth is 4 to 10 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Rock outcrop is limestone and calcareous sandstone.

Runoff is very rapid, and the hazard of water erosion is very low. The hazard of soil blowing is very low.

This unit is used for grazing by both domestic livestock and wildlife.

806--Continued

The potential plant community on the Starley soil is mainly Columbia needlegrass, Idaho fescue, and spike-fescue. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre. The potential plant community on the Starman soil is mainly Columbia needlegrass, bluebunch wheatgrass, and mountainmahogany. The average annual production of air-dry vegetation ranges from 400 to 800 pounds per acre.

808--Nielsen-Nielsen Variant-Rock outcrop, 6 to 60 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are smooth and some areas are broken by bedrock escarpments. The native vegetation is mainly Idaho fescue, Sandberg bluegrass, lupine, vetch, and big sagebrush. Elevation is 7200 to 10,000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 30 percent Nielsen channery loam on sideslopes, 25 percent Nielsen Variant clay loam on sideslopes and ridges, and 20 percent Rock outcrop on escarpments and eroded ridges. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Bachus loam on drainage bottoms and alluvial fans, 10 percent Gilispie cobbly loam on ridge tops and sideslopes, 5 percent Merino gravelly sandy clay loam on very steep sideslopes, and 5 percent Burnette loam on drainage bottoms. The percentage varies from one area to another.

The Nielsen channery loam soil is shallow and well drained. It formed in residuum derived dominantly from fine-grained igneous rock. Typically, the surface layer is dark gray channery loam about 7 inches thick. The subsoil is grayish brown very channery clay loam about 5 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen channery loam soil is moderate. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Nielsen Variant clay loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from mudstone and intrusive rock. Typically, the surface layer is dark grayish brown clay loam about 2 inches thick. The subsoil is grayish brown clay about 14 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen Variant clay loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Rock outcrop is igneous rock.

Runoff is very rapid, and the hazard of water erosion is very low. The hazard of soil blowing is very low.

This unit is used for grazing by domestic livestock and wildlife.

808--Continued

The potential plant community on the Nielsen soil is mainly Columbia needlegrass, Idaho fescue, and spike-fescue. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre. The potential plant community on the Nielsen Variant is mainly Idaho fescue, Columbia needlegrass, bluebunch wheatgrass, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre.

810--Gilispie-Bachus-Nielsen complex, 3 to 60 percent slopes. This unit is on gently sloping to steep mountain slopes. Slopes are irregular and some areas are broken by bedrock escarpments. The native vegetation is mainly bluebunch wheatgrass, Sandberg bluegrass, Canby bluegrass, lupine, yarrow, big sagebrush, and limber pine. Elevation is 7200 to 10,000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 32 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 40 percent Gilispie cobbly loam on summits and sideslopes of ridges, 20 percent Bachus loam on footslopes, and 20 percent Nielsen channery loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on escarpments and ridge crests, 5 percent Nielsen Variant clay loam on ridge tops and sideslopes, and 5 percent Burnette loam on footslopes, small fans, and valley fills. The percentage varies from one area to another.

The Gilispie cobbly loam soil is shallow and well drained. It formed in gravelly or cobbly residuum derived dominantly from fine-grained igneous rocks. Typically, the surface layer is dark grayish brown cobbly loam about 2 inches thick. The subsoil is grayish brown cobbly clay loam about 17 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Gilispie cobbly loam soil is moderate. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Bachus loam soil is moderately deep and well drained. It formed in loamy alluvium derived dominantly from hard sandstone. Typically, the surface layer is dark gray loam about 4 inches thick. The subsoil is grayish brown clay loam about 16 inches thick. The substratum is grayish brown clay loam about 10 inches thick over sandstone. Depth to hard sandstone ranges from 20 to 40 inches.

Permeability of the Bachus loam soil is moderate. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Nielsen channery loam soil is shallow and well drained. It formed in very channery residuum derived dominantly from fine-grained igneous rock. Typically, the surface layer is dark grayish brown channery loam about 7 inches thick. The subsoil is grayish brown very channery clay loam about 5 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen channery loam soil is moderate. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

810--Continued

The potential plant community on the Gilispie, Nielsen, and Bachus soils is mainly Columbia needlegrass, Idaho fescue, and spike-fescue. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre on Gilispie and Nielsen and from 1100 to 1600 pounds per acre on Bachus.

812--Bachus-Mayoworth complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep mountain slopes. Slopes are smooth to irregular. The native vegetation is mainly Idaho fescue, Sandberg bluegrass, mountain brome, Kentucky bluegrass, lupine, big sagebrush. Elevation is 7200 to 8500 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 30 to 60 days.

This unit is 50 percent Bachus loam on footslopes and fans and 30 percent Mayoworth clay loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on escarpments and eroded ridge tops, 6 percent Nielsen cobbly loam on ridge tops and sideslopes, and 4 percent Burnette loam on north slopes, fans, terraces, and footslopes. The percentage varies from one area to another.

The Bachus loam soil is moderately deep and well drained. It formed in loamy alluvium derived dominantly from hard sandstone. Typically, the surface layer is dark gray loam about 4 inches thick. The subsoil is grayish brown clay loam about 16 inches thick. The substratum is grayish brown clay loam about 10 inches thick over sandstone. Depth to hard sandstone ranges from 20 to 40 inches.

Permeability of the Bachus loam soil is moderate. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Mayoworth clay loam soil is moderately deep and well drained. It formed in fine-textured alluvium derived dominantly from slaty clay shale and mudstone. Typically, the surface layer is dark yellowish brown clay loam about 7 inches thick. The subsoil is grayish brown to dark grayish brown clay about 17 inches thick over mudstone. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Mayoworth clay loam soil is slow. Available water capacity is about 4 to 8 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Bachus soil is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre. The potential plant community on the Mayoworth soil is mainly Columbia needlegrass, spike-fescue, Idaho fescue, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre.

813--Cryoborolls-Cryorthents complex, 10 to 60 percent slopes. This map unit is on land slides and slumps on steep mountain slopes. Slopes are highly irregular and unstable. The native vegetation is mainly shrub grassland with some trees. Elevation is 7000 to 9000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 70 percent Cryoborolls and 30 percent Cryorthents. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Cryoborolls are mostly deep and well to somewhat poorly drained. They formed in colluvium from land slides and slumps derived dominantly from soft shale and fine-grained igneous rock. Typically, the surface layer is very dark grayish brown. In many areas the soils are loam, clay loam, or clay with highly variable content of gravel, cobbles, and stones. Depth to bedrock ranges from 10 to 60 inches or more.

The Cryorthents are mostly deep and well to somewhat poorly drained. They formed in colluvium from land slides and slumps derived dominantly from soft shale and fine-grained igneous rock. Typically, the surface layer is light brownish gray. In many areas the soils are loam, clay loam, or clay with highly variable content of gravel, cobbles, and stones. Depth to bedrock ranges from 10 to 60 inches or more.

This unit is used for grazing by both domestic livestock and wildlife.

The potential plant community on the Cryoborolls and Cryorthents is mainly Idaho fescue, bluebunch wheatgrass, Columbia needlegrass, mountain brome, Canby bluegrass, Sandberg bluegrass, spruce, fir, and lodgepole pine.

814--Mayoworth-Burnette-Nielsen Variant complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep mountain slopes. Slopes are smooth to irregular. The native vegetation is mainly Idaho fescue, Sandberg bluegrass, mountain brome, lupine, and big sagebrush. Elevation is 7200 to 8500 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 30 to 60 days.

This unit is 35 percent Mayoworth clay loam on sideslopes, 25 percent Burnette loam on footslopes and fans, and 20 percent Nielsen Variant clay loam on sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on ridges and escarpments and 10 percent Nielsen channery loam on ridge tops and steep sideslopes. The percentage varies from one area to another.

The Mayoworth clay loam soil is moderately deep and well drained. It formed in fine-textured alluvium derived dominantly from clay shale and mudstone. Typically, the surface layer is dark brown clay loam about 7 inches thick. The subsoil is grayish brown, dark grayish brown, and olive gray clay about 17 inches thick over siltstone. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Mayoworth clay loam soil is slow. Available water capacity is about 4 to 8 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Burnette loam soil is very deep and well drained. It formed in fine-textured alluvium derived dominantly from sedimentary rock. Typically, the surface layer is grayish brown loam about 2 inches thick. The subsoil is very dark gray clay loam and clay about 18 inches thick. The substratum is grayish brown clay about 40 inches thick.

Permeability of the Burnette loam soil is moderately slow. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Nielsen Variant clay loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from mudstone and intrusive rock. Typically, the surface layer is dark grayish brown clay loam about 2 inches thick. The subsoil is grayish brown clay about 14 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen Variant clay loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by both domestic livestock and wildlife.

814--Continued

The potential plant community on the Mayoworth soil is mainly Columbia needlegrass, spike-fescue, Idaho fescue, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre. The potential plant community on the Burnette soil is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre. The potential plant community on the Nielsen Variant is mainly Columbia needlegrass, Idaho fescue, bluebunch wheatgrass, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre.

815--Bridger-Nielsen Variant complex, 3 to 30 percent slopes. This map unit is on outwash terraces and glacial moraines. Slopes are smooth to irregular. The native vegetation is mainly western wheatgrass, Sandberg bluegrass, Canby bluegrass, vetch, big sagebrush, and Idaho fescue. Elevation is 7200 to 8600 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 30 to 60 days.

This unit is 70 percent Bridger cobbly clay loam on outwash terraces and glacial moraines and 15 percent Nielsen Variant clay loam on footslopes and sideslopes of the ridges. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 15 percent Burnette loam and Millerlake loam on bottoms and small fans. The percentage varies from one area to another.

The Bridger cobbly clay loam soil is very deep and well drained. It formed in glacial drift derived dominantly from sedimentary and igneous rocks. Typically, the surface layer is dark grayish brown cobbly clay loam about 8 inches thick. The subsoil is grayish brown clay about 11 inches thick. The substratum is white, highly calcareous gravelly and very gravelly clay loam about 40 inches thick.

Permeability of the Bridger cobbly clay loam soil is moderately slow. Available water capacity is about 7 to 11 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Nielsen Variant clay loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from mudstone and intrusive rock. Typically, the surface layer is dark grayish brown clay loam about 2 inches thick. The subsoil is grayish brown clay about 14 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen Variant clay loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Bridger soil is mainly Columbia needlegrass, spike-fescue, Idaho fescue, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre. The potential plant community on the Nielsen Variant is mainly Columbia needlegrass, Idaho fescue, bluebunch wheatgrass, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre.

816--Nielsen-Millerlake complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep mountain slopes. Slopes are smooth to irregular. The native vegetation is mainly Idaho fescue, Sandberg bluegrass, Canby bluegrass, Kentucky bluegrass, rubber rabbitbrush, and big sagebrush. Elevation is 7200 to 9000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 60 percent Nielsen channery loam on ridge crests and sideslopes and 20 percent Millerlake loam on footslopes, fans, and bottoms. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Rock outcrop on eroded ridge tops, 7 percent Gilispie cobbly loam on dissected ridges and sideslopes, and 8 percent Nielsen Variant clay loam on sideslopes and footslopes. The percentage varies from one area to another.

The Nielsen channery loam soil is shallow and well drained. It formed in residuum derived dominantly from fine-grained igneous rock. Typically, the surface layer is dark gray channery loam about 7 inches thick. The subsoil is grayish brown very channery clay loam about 5 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen channery loam soil is moderate. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Millerlake loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from sedimentary rock. Typically, the surface layer is grayish brown loam about 5 inches thick. The subsoil is dark grayish brown clay loam about 18 inches thick. The substratum is grayish brown loam about 19 inches thick over calcareous gravel and sand.

Permeability of the Millerlake loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Nielsen soil is mainly Columbia needlegrass, Idaho fescue, and spike-fescue. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre. The potential plant community on the Millerlake soil is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre.

818--Nielsen-Gilispie complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep mountain slopes. Slopes are smooth to irregular. The native vegetation is mainly Idaho fescue, Sandberg bluegrass, bluebunch wheatgrass, lupine, and phlox. Elevation is 7200 to 10000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 32 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 55 percent Nielsen channery loam on sideslopes and 25 percent Gilispie cobbly loam on dissected ridges and sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 8 percent Rock outcrop on escarpments and eroded ridge tops, 4 percent Nielsen Variant clay loam on ridge tops and sideslopes, 4 percent Bachus loam on drainage bottoms and alluvial fans, and 4 percent Merino gravelly sandy clay loam on steep south slopes. The percentage varies from one area to another.

The Nielsen channery loam soil is shallow and well drained. It formed in very channery residuum derived dominantly from fine-grained igneous rock. Typically, the surface layer is dark gray channery loam about 7 inches thick. The subsoil is grayish brown very channery clay loam about 5 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen channery loam soil is moderate. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Gilispie cobbly loam soil is shallow and well drained. It formed in gravelly and cobbly residuum derived dominantly from fine-grained igneous rock. Typically, the surface layer is dark gray cobbly loam about 2 inches thick. The subsoil is dark gray to grayish brown cobbly clay loam about 17 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Gilispie cobbly loam soil is moderate. Available water capacity is about 1½ to 2½ inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used fro grazing by domestic livestock and wildlife.

The potential plant community on the Nielsen and Gilispie soils is mainly Columbia needlegrass, Idaho fescue, and spike-fescue. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre.

820--Bachus-Wix complex, 3 to 45 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are smooth to irregular and broken by rock escarpments. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, Kentucky bluegrass, prairie junegrass, spruce, fir, and shrubs. Elevation is 7200 to 9000 feet. The average annual precipitation is about 15 to 24 inches, the average annual air temperature is 34 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 40 percent Bachus loam on footslopes and fans and 40 percent Wix very fine sandy loam on steep sideslopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Judkins stony silt loam on sideslopes and 10 percent Rock outcrop on eroded ridges and escarpments. The percentage varies from one area to another.

The Bachus loam soil is moderately deep and well drained. It formed in loamy alluvium derived dominantly from hard sandstone. Typically, the surface layer is dark gray loam about 4 inches thick. The subsoil is grayish brown clay loam about 16 inches thick. The substratum is grayish brown clay loam about 10 inches thick over sandstone. Depth to hard sandstone ranges from 20 to 40 inches.

Permeability of the Bachus loam soil is moderate. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Wix very fine sandy loam soil is moderately deep and well drained. It formed in loamy alluvium derived dominantly from fine-grained igneous rock. Typically, the surface layer is dark gray very fine sandy loam about 4 inches thick. The subsurface layer is light gray fine sandy loam about 6 inches thick. The subsoil is grayish brown sandy clay loam about 20 inches thick over bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Wix very fine sandy loam soil is moderate. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is low, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife, and for timber production.

The potential plant community on the Bachus soil is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre. The potential plant community on the Wix soil is mainly spruce, fir, and lodgepole pine.

822--Starley-Bachus-Starman complex, 6 to 60 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are smooth to irregular. The native vegetation is mainly Idaho fescue, Sandberg bluegrass, Canby bluegrass, lupine, phlox, and big sagebrush. Elevation is 7200 to 9400 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 36 to 42 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 45 percent Starley loam on sideslopes and ridges, 20 percent Bachus loam on footslopes, and 20 percent Starman gravelly loam on sideslopes and ridge crests. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on ridge tops and escarpments and 5 percent Millerlake loam and Burnette loam on bottoms, drainageways, and small fans. The percentage varies from one area to another.

The Starley loam soil is shallow and well drained. It formed in calcareous loamy residuum derived dominantly from highly calcareous sandstone and limestone. Typically, the surface layer is dark gray loam about 8 inches thick. The subsoil is light gray very gravelly loam about 11 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Starley loam soil is moderate. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Bachus loam soil is moderately deep and well drained. It formed in loamy alluvium derived dominantly from hard sandstone. Typically, the surface layer is dark gray loam about 4 inches thick. The subsoil is grayish brown clay loam about 16 inches thick. The substratum is grayish brown clay loam about 10 inches thick over sandstone. Depth to hard sandstone ranges from 20 to 40 inches.

Permeability of the Bachus loam soil is moderate. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Starman gravelly loam soil is very shallow and well drained. It formed in calcareous loamy residuum derived dominantly from limestone and highly calcareous sandstone. Typically, the surface layer is grayigh brown gravelly loam about 3 inches thick. The subsoil is light brownish gray strongly calcareous very gravelly loam about 6 inches thick over bedrock. Depth to bedrock ranges from 4 to 10 inches.

Permeability of the Starman gravelly loam soil is moderate. Available water capacity is about ½ to 1 inch. Effective rooting depth is 4 to 10 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

822--Continued

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Starley soil is mainly Columbia needlegrass, Idaho fescue, and spike-fescue. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre. The potential plant community on the Bachus soil is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre. The potential plant community on the Starman soil is mainly Columbia needlegrass, bluebunch wheatgrass, and mountainmahogany. The average annual production of air-dry vegetation ranges from 400 to 800 pounds per acre.

850--Millerlake-Adel loams, 3 to 30 percent slopes. This map unit is on gently sloping to moderately steep alluvial fans, footslopes, and bottoms. Slopes are smooth. The native vegetation is mainly Columbia needlegrass, bluebunch wheatgrass, Idaho fescue, Kentucky bluegrass, lupine, big sagebrush, and scattered fir, pine, and aspen. Elevation is 7200 to 8500 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 30 to 60 days.

This unit is 50 percent Millerlake loam on footslopes and fans and 25 percent Adel loam on fans and bottoms. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Bachus loam on footslopes, 8 percent Burnette loam on north sideslopes, fans, and bottoms, and 7 percent Aquic Cryoborolls on bottoms. The percentage varies from one area to another.

The Millerlake loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from sedimentary and igneous rocks. Typically, the surface layer is grayish brown and gray loam about 5 inches thick. The subsoil is dark gray to dark grayish brown clay loam about 17 inches thick. The substratum is grayish brown loam and gravelly loam about 19 inches thick over very gravelly sandy loam.

Permeability of the Millerlake loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Adel loam soil is very deep and well drained. It formed in loamy alluvium derived dominantly from sedimentary and igneous rocks. Typically, the surface layer is dark gray loam about 42 inches thick. The underlying material to a depth of 60 inches is grayish brown clay loam.

Permeability of the Adel loam soil is moderate. Available water capacity is about 8 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Millerlake and Adel soils is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre.

854--Burnette-Millerlake loams, 3 to 30 percent slopes. This map unit is on gently sloping to moderately steep alluvial fans, footslopes, and bottoms. Slopes are smooth to irregular. The native vegetation is mainly Idaho fescue, bluebunch wheatgrass, Columbia needlegrass, Sandberg bluegrass, lupine, big sagebrush, and scattered trees. Elevation is 7200 to 9000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 50 percent Burnette loam on footslopes and fans and 35 percent Millerlake loam on footslopes, fans, and bottoms. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Nielsen Variant clay loam, Mayoworth clay loam, and Nielsen channery loam on sideslopes, and 5 percent Adel loam on fans and bottoms. The percentage varies from one area to another.

The Burnette loam soil is very deep and well drained. It formed in fine-textured alluvium derived dominantly from sedimentary and igneous rock. Typically, the surface layer is grayish brown loam about 2 inches thick. The subsoil is very dark gray clay loam and clay about 18 inches thick. The underlying material to a depth of 60 inches is grayish brown clay.

Permeability of the Burnette loam soil is moderately slow. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Millerlake loam soil is deep and well drained. It formed in loamy alluvium derived dominantly from sedimentary and igneous rock. Typically, the surface layer is grayish brown loam about 5 inches thick. The subsoil is dark gray to dark grayish brown clay loam aobut 18 inches thick. The substratum is grayish brown loam about 19 inches thick over calcareous gravel and sand.

Permeability of the Millerlake loam soil is moderate. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Burnette and Millerlake soils is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre.

870--Wix-Judkins complex, 6 to 60 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are irregular and broken. The native vegetation is mainly spruce, fir, and aspen. Elevation is 7400 to 9000 feet. The average annual precipitation is about 15 to 24 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 50 percent Wix very fine sandy loam on sideslopes and 25 percent Judkins stony silt loam on sideslopes and ridge tops. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on eroded ridges and escarpments, 8 percent Bachus loam on toeslopes and bottoms, 5 percent Starley loam on sideslopes, and 2 percent Starman gravelly loam on ridge crests and sideslopes. The percentage varies from one area to another.

The Wix soil is moderately deep and well drained. It formed in loamy colluvium derived dominantly from fine-grained igneous rock. Typically, the surface layer is dark gray very fine sandy loam about 4 inches thick. The subsurface layer is light gray fine sandy loam about 6 inches thick. The subsoil is grayish brown to light brownish gray sandy clay loam about 20 inches thick over bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Wix very fine sandy loam soil is moderate. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Judkins stony silt loam soil is moderately deep and well drained. It formed in colluvium and loess derived dominantly from sedimentary and igneous rock. Typically, the surface layer is light brownish gray stony silt loam about 4 inches thick. The subsoil is grayish brown to brown very stony silty clay loam about 18 inches thick over bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Judkins stony silt loam soil is moderate. Available water capacity is about 3½ to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for timber production and limited grazing of the understory.

The potential plant community on the Wix and Judkins soils is mainly spruce, fir, and lodgepole pine.

872--Burnette-Nielsen Variant-Rock outcrop complex, 3 to 45 percent slopes. This map unit is on gently sloping to steep mountain slopes. Slopes are smooth to irregular and broken by Rock outcrop escarpments. The native vegetation is mainly Idaho fescue, Sandberg bluegrass, Columbia needlegrass, lupine, and big sagebrush. Elevation is 7200 to 9000 feet. The average annual precipitation is about 15 to 19 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 30 percent Burnette loam on footslopes and fans, 25 percent Nielsen Variant clay loam on sideslopes and footslopes, and 20 percent Rock outcrop on ridge crests and escarpments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Bachus loam on fans and bottoms, 5 percent Nielsen channery loam on ridge tops and sideslopes, and 5 percent Gilispie cobbly loam on ridge tops and sideslopes. The percentage varies from one area to another.

The Burnette loam soil is very deep and well drained. It formed in fine-textured alluvium derived dominantly from sedimentary rock. Typically, the surface layer is grayish brown loam about 2 inches thick. The subsoil is very dark gray clay loam and clay about 18 inches thick. The underlying material to a depth of 60 inches is grayish brown clay.

Permeability of the Burnette loam soil is moderately slow. Available water capacity is about 7 to 12 inches. Effective rooting depth is 40 to 60 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Nielsen Variant clay loam soil is shallow and well drained. It formed in fine-textured residuum derived dominantly from mudstone and intrusive rock. Typically, the surface layer is dark grayish brown clay loam about 2 inches thick. The subsoil is grayish brown clay about 14 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Nielsen Variant clay loam soil is slow. Available water capacity is about 1½ to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Rock outcrop is hard igneous rock. Runoff is very rapid, and the hazard of water erosion is very low. The hazard of soil blowing is very low.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Burnette soil is mainly Columbia needlegrass, spike-fescue, and Idaho fescue. The average annual production of air-dry vegetation ranges from 1100 to 1600 pounds per acre. The potential plant community on the Nielsen Variant is mainly Idaho fescue, Columbia needlegrass, bluebunch wheatgrass, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 500 to 1000 pounds per acre.

876--Wetterhorn-Wetterhorn Variant complex, 6 to 60 percent slopes. This map unit is on sloping to steep mountain slopes. Slopes are smooth to irregular and broken. The native vegetation is mainly spruce, fir, and aspen. Elevation is 7400 to 9000 feet. The average annual precipitation is about 15 to 24 inches, the average annual air temperature is 35 to 45 degrees F, and the average frost-free period is 20 to 60 days.

This unit is 40 percent Wetterhorn stony loam on sideslopes and 40 percent Wetterhorn Variant very stony loam on sideslopes and ridge tops. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Rock outcrop on escarpments, 5 percent Bachus loam on toeslopes and bottoms, and 5 percent Judkins stony silt loam and Wix very fine sandy loam on north slopes. The percentage varies from one area to another.

The Wetterhorn stony loam soil is moderately deep and well drained. It formed in colluvium derived dominantly from sedimentary and igneous rock. Typically, the surface layer is dark grayish brown stony loam about 1 inch thick. The subsurface layer is light brownish gray stony loam and stony clay loam about 8 inches thick. The subsoil is grayish brown and brown stony clay loam about 15 inches thick over bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Wetterhorn stony loam soil is slow. Available water capacity is about 4 to 7 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

The Wetterhorn Variant very stony loam soil is moderately deep and well drained. It formed in colluvium derived dominantly from sedimentary and igneous rock. Typically, the surface layer is organic duff of decomposing needles about 1 inch thick. The subsurface layer is grayish brown very stony loam about 2 inches thick. The subsoil is grayish brown to light brownish gray very stony clay loam and very stony clay about 30 inches thick over bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Wetterhorn Variant very stony loam soil is slow. Available water capacity is about 3 to 6 inches. Effective rooting depth is 20 to 40 inches. Runoff is moderate to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is low.

This unit is used for timber production and limited grazing by domestic livestock and wildlife.

The potential plant community on the Wetterhorn and Wetterhorn Variant soils is mainly spruce, fir, and lodgepole pine.

902--Samsil-Shingle-Rock outcrop complex, 3 to 45 percent slopes. This map unit is on gently sloping to moderately steep ridge tops and sideslopes. Slopes are smooth but some areas are broken by bedrock escarpments. The native vegetation is mainly western wheatgrass, bluebunch wheatgrass, and big sagebrush. Elevation is 4300 to 5500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 49 to 55 degrees F, and the average frost-free period is 120 to 140 days.

This unit is 50 percent Samsil clay on clayey shales, 20 percent Shingle loam on silty shales, and 15 percent Rock outcrop on escarpments and eroded ridges. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Epsie silty clay on shoulders and crests of ridges, 5 percent Orella silty clay on shoulders and sideslopes of ridges, and 5 percent Gaynor clay on footslopes, benches, and broad summits. The percentage varies from one area to another.

The Samsil clay soil is shallow and well drained. It formed in clayey residuum derived dominantly from dark clay shale. Typically, the surface layer is grayish brown clay about 1 inch thick. The subsoil is gray clay about 15 inches thick over dark clayey shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Samsil clay soil is very slow. Available water capacity is about 1 to 2 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Shingle loam soil is shallow and well drained. It formed in loamy residuum derived dominantly from silty shale and interbedded sandstone. Typically, the surface layer is light brownish gray loam about 4 inches thick. The subsoil is light brownish gray loam about 7 inches thick over soft interbedded sandstone and shale. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Shingle loam soil is moderate. Available water capacity is about 1 to 3 inches. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Rock outcrop is shale and sandstone.

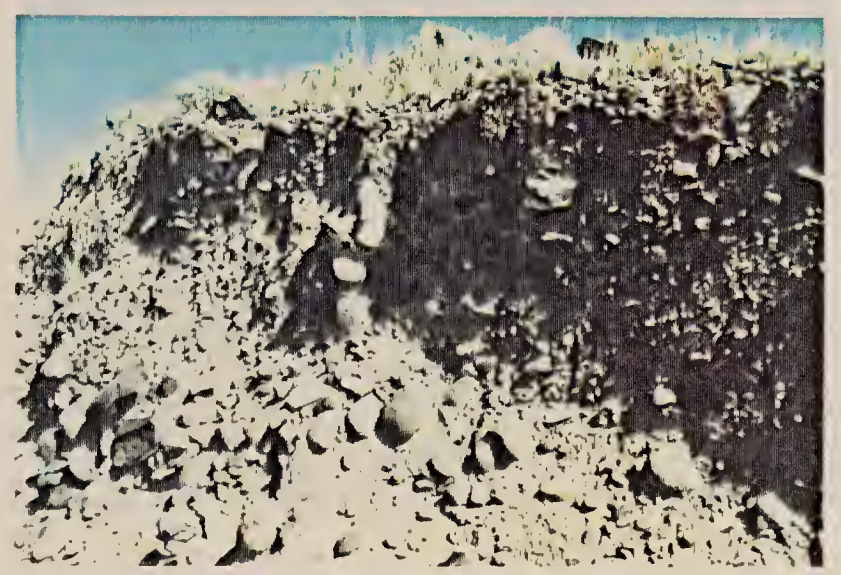
Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for grazing by domestic livestock and wildlife.

The potential plant community on the Samsil clay is Indian ricegrass, bluebunch wheatgrass, and thickspike and western wheatgrass. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre. The potential plant community on the Shingle loam is bluebunch wheatgrass and needleandthread. The average annual production of air-dry vegetation ranges from 350 to 700 pounds per acre.

← Map Unit 322 is shown here. Cattle are shown grazing on the Nihill soil.

Illustrated here is a → profile of Nihill cobbly loam in Map Unit 322.



← Map Unit 410 is illustrated in this photo. Shallow sandy 10-14" PZ and Shallow loamy 10-14" PZ are the dominant range sites here.

Map Unit 448 is seen here. → The soils are saline Torrifluvents. Greasewood is the dominant vegetation.

← A complex of Bondman, Worfka, and Worf soils is seen here. The Map Unit is 410.

The escarpment in the back- → ground is Map Unit 102, very steep rock outcrop. The alluvial fan below the escarpment is Map Unit 69. Kim loam is the dominant soil.

← Shingle and Tassel soils are seen in the foreground. The Map Unit is 111.

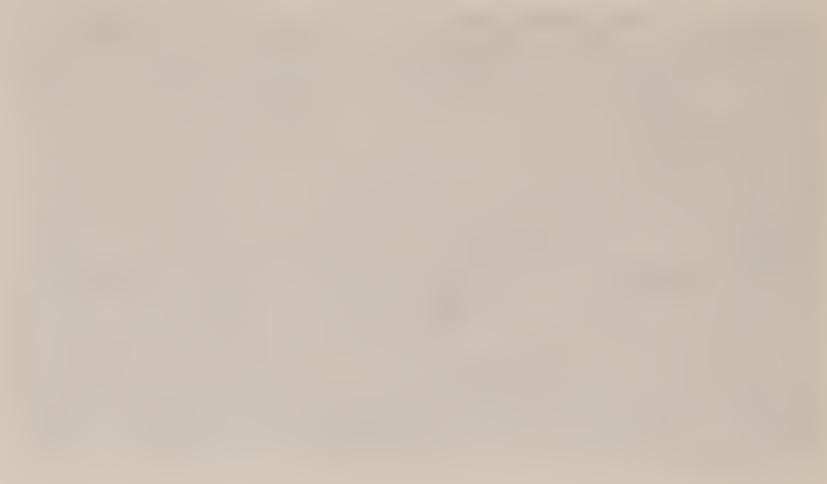
The red soils in the back- → ground are Spearfish and Neville. They are components of Units 446 and 546.

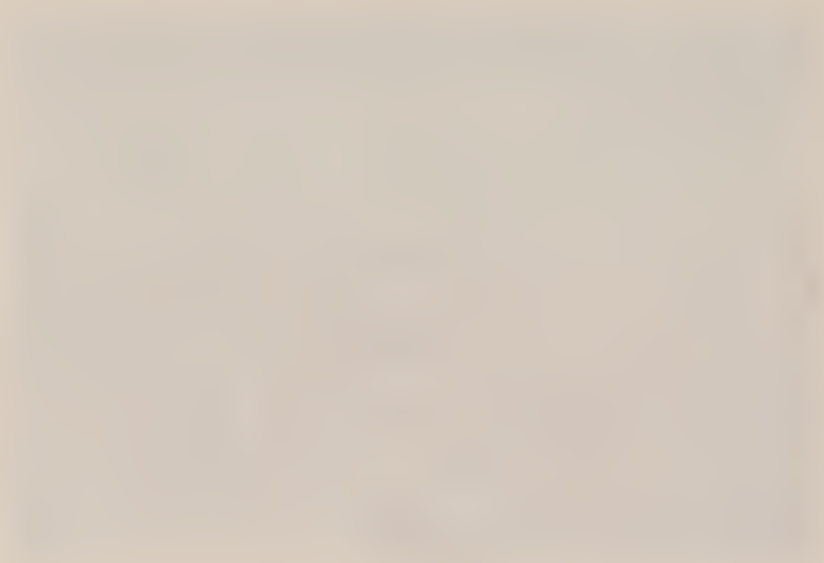
← This illustrates the fine textured soils in Map Unit 246. Shown here is the Orella soil. The range site is Saline upland 10-14" PZ; the dominant vegetation is gardner saltbush.

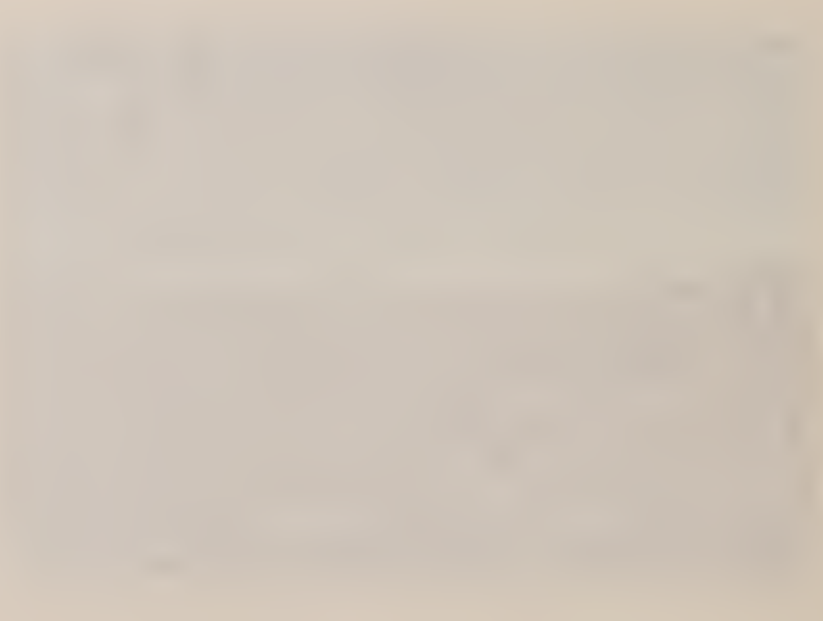
A landscape characteristic → of Map Unit 192 is seen here. Cadoma and Shingle are the dominant soils with some inclusions of Orella soils.

← The slope shown here is representative of Map Unit 606. The components are Hoot channery loam and rock outcrop.

The soil seen in the foreground is Hoot channery loam. The Map Unit is 606. →







← The Travessilla stony loam soil is seen here. The vegetation is characteristic of the Shallow loamy 10-14" PZ range site.

Map Unit 806 is illustrated → in the foreground. The soils are Starley and Starman. The slope in the middle distance is Map Unit 804.

← The steep slopes in the background illustrate Map Unit 810. Map Unit 806 is seen in the foreground.

Map Unit 854 is shown in → the valley adjacent to the stream. The soils are Burnette and Clayburn. A landslip area is shown above the head of the valley.

USE AND MANAGEMENT OF SOILS

Soil-Range Site Relationships

The potential plant community on each major soil in the Area was predicted and a range site was assigned by Soil Conservation Service range specialists using the procedures of the National Range Handbook. Range sites are listed for the components of map units in Table 2. Complete range site descriptions are presented in the appendix.

Other Interpretations

Interpretations are presented for the components of map units in Tables 4, 5, 6, and 7. These interpretations were taken from Soil Conservation Service Soil Interpretations Records (Soils 5) for those soils previously rated. Soils 5 were drafted for most of the new soil series or new phases. A few remaining soils were rated without drafting Soils 5. Ratings are based on standards and procedures of the SCS National Soils Handbook, the SCS Guide for Interpreting Engineering Uses of Soils, the PCA Soils Primer, and Wischmeier and Smith (1978).

Table 4. Engineering properties and classifications
(The symbol < means less than; > means greater than. Absence of an entry means data were not estimated.)

Soil name and map symbol	Depth (in.)	USDA texture	Classification		Frag-	Percentage passing sieve number:				Liquid	Plas-
			United	AASHO	ments >3"(%)	4	10	40	200	limit (%)	ticity index
11-Larimer loam	0-7	Loam	ML	A-4	0-5	85-100	75-100	70-95	40-75	15-25	NP-5
	7-22	Loam	CL	A-6	0-5	80-100	75-100	75-95	50-75	25-35	10-15
	22-30	Gravelly sandy clay loam	SM-SC	A-2	5-10	70-95	50-85	35-75	20-55	20-30	5-10
	30-60	Very gravelly sand	GP	A-1	25-50	25-40	20-30	5-15	0-5		NP
11L-Larimer sandy loam	0-7	Fine sandy loam	SM	A-4	0-5	85-100	75-100	70-95	40-75	15-25	NP-5
	7-22	Loam	CL	A-6	0-5	80-100	75-100	75-95	50-75	25-35	10-15
	22-30	Gravelly sandy clay loam	SM-SC	A-2	5-10	70-95	50-85	35-75	20-55	20-30	5-10
	30-60	Very gravelly sand	GP	A-1	25-50	25-40	20-30	5-15	0-5		NP
11T-Garland	0-4	Loam	CL-ML	A-4	0-10	80-100	75-100	65-90	50-75	25-30	5-10
	4-21	Clay loam	CL	A-6	0-10	80-100	75-100	65-95	55-75	30-40	10-15
	21-30	Sandy clay loam	SC	A-6,A-2	0-10	80-100	75-100	65-85	30-50	30-35	10-15
	30-60	Gravelly loamy sand	GP, GP-GM	A-1	15-25	20-50	20-50	15-25	0-10		NP
-Preatorson	0-3	Gravelly fine sandy loam	GM,SM	A-1,A-2	0-10	50-75	50-75	35-60	20-35		NP
	3-15	Very gravelly sandy clay loam	GM	A-1,A-2	10-30	20-30	20-30	20-25	10-15	30-40	5-10
	15-60	Very gravelly sand	GP	A-1	10-30	20-30	20-30	10-20	0-5		NP
45-Youngston	0-22	Loam, clay loam, silty caly loam	ML,CL	A-4,A-6	0	95-100	95-100	80-100	60-85	35-40	10-20
	22-60	Stratified very fine sandy loam, silt loam, silty clay loam	ML,CL	A-6	0	95-100	95-100	80-100	60-80	35-40	10-20
-Glenton	0-10	Clay loam, loam	CL,ML	A-6,A-4	0-5	80-100	80-100	70-100	35-50	30-40	10-15
	10-60	Stratified sandy loam, clay loam	SC	A-6	0-5	80-100	80-100	70-100	35-50	30-40	10-15

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
46-Petrie	0-4	Clay loam, silty clay loam	CL	A-7	0	80-100	75-100	75-100	60-80	41-45	20-25
	4-60	Clay loam, Clay, silty clay	CL,CH	A-7	0	80-100	75-100	75-100	60-95	41-55	25-35
-Kim	0-4	Silty clay loam, clay loam, loam	CL	A-6	0	85-100	85-100	80-100	70-85	30-40	15-20
	4-16	(same)	CL	A-6	0	85-100	85-100	80-100	70-85	30-40	15-20
	16-60	(same)	CL	A-6	0	85-100	85-100	80-100	70-85	30-40	15-20
47-Petrie	See Petrie, Map Unit 46										
-Cadoma	0-4	Loam, silty clay loam, clay, silty clay	CL,CH	A-7,A-6	0	95-100	95-100	80-90	75-85	41-55	25-35
	4-34	Clay, clay loam, silty clay, silty clay loam	CL,CH	A-7	0	100	100	80-90	75-85	41-55	25-35
60-Cadoma	See Cadoma, Map Unit 47										
-Kim	0-6	Loam, fine sandy loam	ML,SM	A-4	0-5	80-100	75-100	60-90	45-75	20-35	NP-5
	6-60	Loam, clay loam	CL-ML, CL	A-4,A-6	0-5	80-100	75-100	70-95	60-85	25-40	5-15
67-Cadoma	See Cadoma, Map Unit 47										
-Arvada	0-4	fine sandy loam	SM-SC, SM	A-4	0	80-100	75-100	60-80	35-50	20-25	NP-10
	4-14	Clay, silty clay loam, sandy clay	CL,CH	A-7	0	80-100	75-100	70-100	65-95	41-65	20-35
	14-60	Clay loam, silty clay loam, sandy clay loam	CL	A-7	0	80-100	75-100	70-100	55-80	41-45	20-25
-Worfka	0-2	Clay loam, loam	CL	A-6,A-7	0	95-100	90-100	75-95	55-80	35-45	15-20
	2-19	Clay loam	CL	A-6,A-7	0	95-100	90-100	90-100	75-95	35-45	15-20
68-Cadoma	See Cadoma, Map Unit 47										
-Epsie	See Epsie, Map Unit 47										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
69-Kim	See Kim, Map Unit 60										
70-Cadoma	See Cadoma, Map Unit 47										
71-Cadoma	See Cadoma, Map Unit 47										
-Shingle	0-4	Loam	ML	A-4	0-5	75-100	75-100	70-95	55-75	25-35	NP-10
	4-15	Clay loam, loam	CL	A-6	0	75-100	75-100	65-100	50-80	30-40	10-20
72-Absted	0-3	Loam	CL	A-6	0-5	85-100	80-100	75-95	50-65	25-30	10-15
	3-60	Clay, clay loam, silty clay loam	CH,CL	A-7	0	85-100	80-100	80-100	70-95	41-60	20-30
-Arvada	See Arvada, Map Unit 67										
73-Absted	See Absted, Map Unit 72										
-Stoneham	0-4	Loam	CL-ML	A-4	0	80-100	75-100	65-95	60-75	20-30	5-10
	4-9	Clay loam, sandy clay loam, loam	CL,SC, SM-SC, CL-ML	A-6,A-4	0	95-100	90-100	80-100	35-80	25-40	5-20
	9-40	Loam, Clay loam	CL,SC, SM-SC, CL-ML	A-4,A-6	0	95-100	75-100	60-95	45-75	15-30	5-15
	40-60	Sandy loam, gravelly sandy loam	SM,GM	A-2,A-4	0-5	65-100	60-100	50-85	25-50		NP
-Ulm	0-9	Loam, clay loam	ML	A-4	0-5	95-100	95-100	80-100	70-80	30-40	5-10
	9-26	Clay loam, clay	CL	A-6,A-7	0-5	75-100	75-100	75-100	60-80	35-45	20-30
	26-60	Clay loam	CL	A-6	0-5	75-100	75-100	75-100	60-80	30-40	15-20
74-Petrie	See Petrie, Map Unit 46										
-Ulm	See Ulm, Map Unit 73										
75-Arvada	See Arvada, Map Unit 72										
-Kim alkali	See Kim alkali, Map Unit 46										
93-Vona	0-8	Sandy loam, fine sandy loam	SM	A-2,A-4	0	100	90-100	60-90	30-45		NP
	8-30	Fine sandy loam, sandy loam	SM	A-2 A-4	0	100	90-100	60-90	30-45		NP
	30-60	Sandy loam, loamy sand	SM	A-2	0	100	90-100	50-55	15-30		NP

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
102-Rock outcrop	Not rated										
109-Epsie	See Epsie, Map Unit 47										
-Rock outcrop	Not rated										
110-Shingle	0-4	loam	ML	A-4	0-5	75-100	75-100	70-95	55-75	25-35	NP-10
	4-15	clay loam,loam	CL	A-6	0	75-100	75-100	65-100	50-80	30-40	10-20
-Tassel	0-15	fine sandy loam, loamy very fine sand, very fine sandy loam	ML,SM	A-4	0	95-100	90-100	70-95	40-65	20-35	NP-7
111-Rock outcrop	Not rated										
-Shingle	See Shingle, Map Unit 71										
-Tassel	See Tassel, Map Unit 110										
112-Oceanet	0-14	sandy loam,gra-velly sandy loam	GM,SM	A-1, A-2	0-10	55-100	55-100	35-65	20-35		NP
-Persayo	0-14	silty clay loam, clay loam	CL	A-6	0-10	80-100	75-100	75-95	60-85	25-40	10-20
-Rock outcrop	Not rated										
190-Epsie	See Epsie, Map Unit 47										
-Shingle	See Shingle, Map Unit 110										
192-Cadoma	See Cadoma, Map Unit 47										
-Shingle	See Shingle, Map Unit 110										
-Rock outcrop	Not rated										
243-Kim alkali	See Kim alkali, Map Unit 46										
-Kim loam	See Kim loam, Map Unit 60										
244-Kim alkali	See Kim alkali, Map Unit 46										
245-Orella	0-3	silty clay, clay	CH	A-7	0	100	100	90-100	75-95	50-70	30-50
	3-18	clay, clay loam	CH	A-7	0	100	100	90-100	75-95	50-70	30-50
246-Orella	See Orella, Map Unit 245										
-Epsie	See Epsie, Map Unit 47										
247-Torriorthents	Too variable to rate										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
315-Persayo	See Persayo, Map Unit 112										
-Clifterson	0-4	gravelly loam, channery loam, gravelly sandy clay loam	GM, GM-GC	A-4	10-35	60-85	50-75	45-65	35-50	25-35	5-10
	4-60	very gravelly loam, sandy loam, channery loam	GM, GM-GC	A-2	10-35	20-40	20-40	15-35	10-25	25-35	5-10
322-Nihill	0-8	gravelly loam	GM-GC, GM, SM, SM-SC	A-2, A-4	0-5	45-80	35-75	30-70	20-50	25-35	5-10
	8-60	very gravelly loam, gravelly loam	GM	A-2, A-1	0-5	30-60	20-50	15-45	12-35	20-35	NP-5
-Shingle	See Shingle, Map Unit 110										
323-Nihill	See Nihill, Map Unit 322										
324-Larimer	See Larimer loam, Map Unit 11										
-Nihill	See Nihill, Map Unit 322										
325-Larimer	See Larimer, Map Unit 11										
-Stoneham	See Stoneham, Map Unit 73										
-Nihill	See Nihill, Map Unit 322										
345-Vona	See Vona, Map Unit 93										
-Otero	0-14	sandy loam, fine sandy loam, loamy fine sand	SM	A-2	0-1	95-100	75-100	50-80	10-35		NP
	14-60	sandy loam, fine sandy loam, gravelly sandy loam	SM	A-2, A-1	0-1	90-100	50-100	40-80	20-35		NP
346-Nelson	0-9	fine sandy loam	SM,ML	A-4	0-5	75-100	75-100	70-90	45-60		NP
	9-30	fine sandy loam, sandy loam, loamy very fine sand	SM,ML	A-2, A-4	0	75-100	75-100	60-85	30-55		NP
-Terry	0-5	fine sandy loam, sandy loam	SM,ML	A-2, A-4	0-5	75-100	75-100	70-90	30-60		NP
	5-14	fine sandy loam, sandy loam	SM,ML	A-4	0-5	75-100	75-100	70-85	40-60		NP

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
346-Terry(cont.)	14-26	fine sandy loam, sandy loam, loamy fine sand	SM	A-2, A-4	0-5	75-100	75-100	70-85	25-50		NP
-Otero	See Otero, Map Unit 345										
360-Stoneham	See Stoneham, Map Unit 73										
-Kim	See Kim, Map Unit 60										
371-Pavillion	0-11	loam	ML	A-4	0-5	80-100	80-100	65-95	50-75	20-35	5-10
	11-26	loam, clay loam, silty clay loam	CL	A-6, A-7	0-5	80-100	80-100	65-95	50-75	25-45	5-15
-Persayo	See Persayo, Map Unit 112										
372-Tassel	See Tassel, Map Unit 110										
-Nelson	See Nelson, Map Unit 346										
373-Neville	0-10	fine sandy loam, very fine sandy loam, loam	ML,SM	A-4	0-5	90-100	75-100	70-95	40-75	15-25	NP-5
	10-60	loam, silt loam, clay loam	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	85-95	60-80	20-40	5-15
-Tensleep	0-2	very fine sandy loam, loam	ML	A-4	0	95-100	90-100	90-100	55-80	20-30	NP-5
	2-7	silty clay loam, silt loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	90-100	70-95	25-40	5-15
	7-60	very fine sandy loam, silt loam	ML	A-4	0	95-100	90-100	90-100	55-90	20-30	NP-5
375-Bowbac	0-3	sandy loam	SM	A-2	0	90-100	90-100	55-70	20-40		NP
	3-14	sandy clay loam, clay loam	SC,CL	A-2, A-6	0	90-100	90-100	70-90	30-55	30-35	5-15
	14-30	clay loam	CL	A-6	0	90-100	90-100	80-100	60-80	35-40	10-20
-Olney	See Olney, Map Unit 93										
-Arvada	See Arvada, Map Unit 67										
382-Rock outcrop	Not rated										
-Tassel	See Tassel, Map Unit 110										
383-Rock outcrop	Not rated										
-Tassel	See Tassel, Map Unit 110										
-Nelson	See Nelson, Map Unit 346										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
389-Spearfish	0-8	loam, silt loam, very fine silt loam	ML,CL	A-4, A-6	0	100	100	85-100	65-90	25-35	NP-15
	8-16	loam, silt loam, very fine sandy loam	ML,CL	A-4, A-6, A-7	0	95-100	80-100	70-100	50-90	25-35	NP-15
-Neville	See Neville, Map Unit 373										
393-Olney	See Olney, Map Unit 93										
-Bowbac	See Bowbac, Map Unit 375										
394-Saddle	0-2	fine sandy loam, loam, sandy clay loam	SM-SC, CL-ML	A-4	0	100	100	70-90	45-65	25-30	5-10
	2-10	sandy clay loam, clay loam	SM-SC, CL-ML	A-4, A-6	0	100	100	80-95	40-70	25-35	5-15
	10-24	clay loam, loam, silt loam	CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-35	5-15
394-Oceanet	See Oceanet, Map Unit 112										
398-Tassel	See Tassel, Map Unit 110										
-Bowbac	See Bowbac, Map Unit 375										
-Terry	See Terry, Map Unit 346										
410-Bondman	0-3	sandy loam	SM	a-2, A-4	0	80-100	80-100	50-70	25-40		NP
	3-12	sandy clay loam	CL,SC	A-6	0	80-100	80-100	65-90	30-55	30-35	10-15
	12-18	sandy loam	SM	A-2, A-4	0-5	80-100	80-100	50-70	25-40		NP
-Worfka	See Worfka, Map Unit 67										
-Worf	0-14	loam, clay loam	CL	A-6	0-5	80-100	80-100	65-95	50-65	30-35	10-15
411-Bondman	See Bondman, Map Unit 410										
-Rock outcrop	Not rated										
-Worf	See Worf, Map Unit 410										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
426-Larim	0-4	gravelly loam, loam	GM,ML	A-4	0-5	65-85	55-80	45-65	35-55	20-30	NP-5
	4-15	gravelly clay loam,gravelly sandy clay loam	SC,CL	A-6	0-5	70-85	60-80	50-70	35-60	20-35	10-15
	15-60	gravelly sand	GP,SW	A-1	0-5	30-60	20-40	10-25	0-5		NP
-Larimer	See Larimer, Map Unit 11										
445-Rekop	0-4	loam	ML	A-4	0-5	95-100	95-100	85-95	60-75	30-35	5-10
	4-16	gravelly loam, gravelly clay loam, clay loam, silty clay loam	GC,CL	A-4, A-6	0-10	55-100	55-100	50-100	40-95	30-35	5-10
-Gystrum	0-4	loam, silt loam	ML	A-4	0	95-100	95-100	90-100	85-90	30-35	5-10
	4-27	silty clay loam, silt loam	ML	A-4, A-6	0	95-100	95-100	90-100	85-95	30-40	5-15
446-Rock outcrop	Not rated										
-Travessilla	0-8	loam, channery loam, gravelly loam, stony loam	SM,SL	A-4, A-6	0-20	65-100	55-95	50-90	35-70	<30	NP-5
-Spearfish	See Spearfish, Map Unit 389										
447-Travessilla	See Travessilla, Map Unit 446										
448-Torrifluvents, saline	Too variable to rate										
449-Travessilla	See Travessilla, Map Unit 446										
-Rock outcrop	Not rated										
450-Torrifluvents	Too variable to rate										
-Fluvaquents	Too variable to rate										
490-Shingle	See Shingle, Map Unit 71										
-Thedalund	0-4	clay loam, loam, very fine sandy loam	CL, SC, SM-SC, CL-ML	A-4	0-5	80-100	75-100	70-95	40-75	20-30	5-10
	4-30	clay loam,loam, sandy clay loam, silty clay loam	CL-ML, CL,SC, SM-SC	A-6, A-4	0-5	80-100	75-100	70-95	40-80	25-35	5-15

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
546-Spearfish	See Spearfish, Map Unit 389										
-Rock outcrop	Not rated										
-Neville	See Neville, Map Unit 373										
572-Worland	0-30	sandy loam	SM	A-2	0	75-100	75-100	50-65	25-35		NP
-Oceanet	See Oceanet, Map Unit 112										
590-Shingle	See Shingle, Map Unit 71										
-Rock outcrop	Not rated										
601-Youngston	See Youngston, Map Unit 45										
-Uffens	0-3	silt loam, loam, fine sandy loam	ML, CL-ML	A-4	0	100	100	70-100	50-90	15-30	NP-10
	3-30	sandy clay loam, sandy loam, loam	SM-SC, SC, CL, CL-ML	A-4, A-6	0	100	100	80-90	40-60	25-35	5-15
601-Glenton	See Glenton, Map Unit 45										
602-Binton	0-60	stratified very fine sandy loam and clay loam	CL	A-6	0	75-100	75-100	70-100	55-80	35-40	15-20
-Uffens	See Uffens, Map Unit 601										
604-Effington	0-3	clay loam, silty clay loam	CL	A-6	0	75-100	75-100	65-95	55-75	35-40	15-20
	3-19	clay, clay loam, silty clay loam	CL, CH	A-7	0	75-100	75-100	75-100	70-85	45-60	20-35
	19-60	loam, clay loam, silty clay loam	CL-ML, ML	A-4	0	75-100	75-100	65-90	50-70	25-35	5-10
604-Effington Variant	0-30	silty clay loam, clay loam	CL,CH	A-6, A-7	0	75-100	75-100	65-100	55-85	40-60	15-35
606-Hoot	0-16	stratified gravelly loam and channery clay loam	GM,SM	A-2, A-4	5-60	55-80	50-80	40-70	30-50	25-35	NP-10
-Rock outcrop	Not rated										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
645-Mudray	0-2	Sandy loam very fine sandy loam	SM,ML	A-2,A-4	0	75-100	75-100	50-95	25-65		NP-5
	2-12	Clay, sandy clay	SC,CL	A-7	0	75-100	75-100	70-100	60-90	45-55	20-30
	12-17	Sandy clay loam	SC	A-6	0	75-100	75-100	65-90	40-50	30-40	15-20
-Persayo	See Persayo, Map Unit 112										
-Effington Variant	See Effington Variant, Map Unit 604										
650-Mudray clay loam	0-2	Clay loam	CL	A-6	0	75-100	75-100	65-90	40-50	30-40	15-20
	2-12	Clay, sandy clay	SC,CL	A-7	0	75-100	75-100	70-100	60-90	45-55	20-30
	12-17	Sandy clay loam	SC	A-6	0	75-100	75-100	65-90	40-50	30-40	15-20
671-Rock outcrop	Not rated										
-Persayo	See Persayo, Map Unit 112										
675-Pavillion	See Pavillion, Map Unit 371										
-Youngston	See Youngston, Map Unit 45										
700-Stoneham	See Stoneham, Map Unit 73										
-Cushman	0-7	Loam	ML, CL-ML	A-4	0	100	85-100	85-95	60-75	20-30	NP-10
	7-12	Clay loam	CL	A-6	0	100	90-100	85-95	70-80	25-35	10-15
	12-24	Loam, clay loam, sandy loam	CL-ML CL, SM-SC	A-4,A-6	0	100	85-100	85-95	60-75	25-30	5-10
701-Fort Collins	0-8	Loam	ML, CL-ML	A-4	0	95-100	90-100	85-100	50-65	25-35	5-10
	8-18	Loam, clay loam	CL	A-6	0	95-100	90-100	85-95	60-75	25-40	15-25
	18-60	Loam	CL, CL-ML	A-4,A-6	0	95-100	90-100	80-95	50-75	25-35	5-15
-Kim	See Kim, Map Unit 60										
702-Absted	See Absted, Map Unit 72										
-Fort Collins	See Fort Collins, Map Unit 701										
703-Fort Collins	See Fort Collins, Map Unit 701										
-Cushman	See Cushman, Map Unit 700										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
705-Kim	See Kim, Map Unit 60										
-Thedalund	See Thedalund, Map Unit 490										
706-Cushman	See Cushman, Map Unit 700										
-Terry	See Terry, Map Unit 346										
-Worf	See Worf, Map Unit 410										
708-Renohill	0-7	Clay loam, loam, silty clay loam	CL	A-6	0	85-100	85-100	80-95	70-80	25-40	10-20
	7-14	Clay, clay loam	CL,CH	A-7,A-6	0	95-100	90-100	90-100	75-95	35-65	20-35
	14-30	Clay loam, sandy clay loam	CL	A-6	0	85-100	80-100	80-95	70-80	30-40	15-25
-Cushman	See Cushman, Map Unit 700										
-Worfka	See Worfka, Map Unit 67										
709-Renohill	See Renohill, Map Unit 708										
-Cadoma	See Cadoma, Map Unit 47										
-Worfka	See Worfka, Map Unit 67										
710-Cadoma	See Cadoma, Map Unit 47										
-Renohill	See Renohill, Map Unit 708										
-Ulm	See Ulm, Map Unit 73										
720-Blazon	0-14	Loam	ML, CL-ML	A-4	0-5	80-100	80-100	70-90	55-70	25-35	5-10
-Rock outcrop	Not rated										
722-Blazon	See Blazon, Map Unit 720										
723-Blazon	See Blazon, Map Unit 720										
-Delphill	0-3	Loam	CL-ML, ML	A-4	0	100	100	85-95	60-75	20-30	5-10
	3-28	Loam, clay loam, silty clay loam	CL-ML, CL	A-4,A-6	0	100	100	85-95	65-85	25-35	5-15
724-Blazon	See Blazon, Map Unit 720										
-Brownsto	0-10	Gravelly sandy loam, gravelly loam	SM,SC, SM-SC, ML	A-2	0-15	60-85	50-75	40-70	15-30	NV-30	5-10
	10-60	Very gravelly sandy loam, very gravelly loam	SM, SM-SC, SC-GM	A-2	10-40	60-80	45-70	35-65	15-30	NV-30	NP-10
725-Blazon	See Blazon, Map Unit 720										
-Diamondville	0-7	Loam	CL-ML	A-4	0-5	95-100	90-100	85-95	60-75	15-25	5-10
	7-20	Clay loam		A-6,A-7	0-5	95-100	90-100	85-95	70-80	35-45	15-25
	20-28	Loam	CL-ML	A-4	0-5	95-100	90-100	85-95	60-75	15-25	5-10

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
730-Forelle	0-4	Loam, very fine sandy loam	CL-ML, ML	A-4	0-10	85-100	85-100	70-90	55-70	25-35	5-10
	4-20	Clay loam, loam	CL	A-6	0-10	85-100	85-100	75-95	55-80	30-40	10-20
	20-60	Loam, clay loam	CL-ML, CL	A-4	0-10	85-100	85-100	70-90	55-70	25-35	10-15
-Diamondville	See Diamondville, Map Unit 725										
732-Thermopolis	0-4	Loam, clay loam	ML,CL	A-4,A-6	0	80-100	80-100	70-90	50-70	15-25	NP-5
	4-15	Loam, clay loam	ML,CL	A-4,A-6	0	80-100	80-100	70-90	50-70	15-25	NP-5
-Rock outcrop	Not rated										
735-Patent	0-60	Clay loam, loam	CL,ML	A-6,A-4	0-5	95-100	95-100	80-90	60-85	30-45	10-25
-Forelle	See Forelle, Map Unit 730										
736-Forelle	See Forelle, Map Unit 730										
-Pinelli	0-3	Loam	CL-ML, ML	A-4	0	75-100	75-100	65-90	50-80	25-35	5-10
	3-21	Clay loam, silty clay loam	CL	A-6,A-7	0	75-100	75-100	70-100	60-95	35-45	15-25
	21-60	Clay loam, silty clay loam	CL	A-6	0	75-100	75-100	65-90	55-95	25-35	10-15
737-Forelle	See Forelle, Map Unit 730										
-Alcova	0-3	Loam	ML	A-4	0-5	85-95	80-90	70-85	50-70	15-25	5-10
	3-18	Clay loam	CL	A-6	0-5	85-95	80-90	75-90	50-75	30-40	11-20
	18-25	Sandy clay loam	SC	A-6	0-5	85-95	80-90	65-80	25-50	30-40	11-20
	25-60	Gravelly sandy loam	SM	A-2	5-25	25-55	20-50	20-45	15-30		NP
749-Renohill	See Renohill, Map Unit 708										
-Worfka	See Worfka, Map Unit 67										
750-Worfka	See Worfka, Map Unit 67										
-Cushman	See Cushman, Map Unit 700										
751-Worfka	See Worfka, Map Unit 67										
-Shingle	See Shingle, Map Unit 71										
-Rock outcrop	Not rated										
752-Epsie	See Epsie, Map Unit 47										
753-Gaynor	0-6	Silty clay loam, clay loam, clay	CL	A-7,A-6	0	95-100	95-100	95-100	70-90	30-50	15-35
	6-30	Silty clay loam, silty clay, clay	CL,CH	A-7	0	95-100	95-100	95-100	75-95	40-60	20-40
-Samsil	0-17	Clay	CH	A-7	0	100	85-100	80-100	70-100	50-85	25-60

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
802-Rock outcrop	Not rated										
-Starman	0-4	Gravelly loam	GM	A-1,A-2	0-15	35-55	30-50	30-45	20-35	30-40	5-10
	4-8	Very gravelly loam	GM	A-1,A-2	0-15	35-55	30-50	30-45	20-35	30-40	5-10
804-Rock outcrop	Not rated										
-Merino	0-3	Gravelly sandy clay loam	GC	A-2,A-6	40-60	30-55	25-50	20-45	15-40	20-40	NP-10
	3-9	Very gravelly sandy clay loam	GC	A-2,A-1	40-60	25-45	25-45	20-40	10-30	20-40	NP-10
	9-15	Very gravelly clay loam	GC	A-2,A-1	40-60	25-45	25-45	20-40	10-30	20-40	NP-10
806-Starley	0-9	Cobbly loam, gravelly loam	GM-GC, SM,GM, SM-SC	A-4	15-35	55-80	55-80	50-70	35-50	25-35	5-10
	9-15	Very cobbly loam, very gravelly loam	GM-GC, SM,GM, SM-SC	A-2,A-4	50-75	45-80	45-80	40-70	30-50	25-35	5-10
-Starman	0-4	Gravelly loam, channery loam, very channery loam	GM	A-1,A-2	0-15	35-55	30-50	30-45	20-35	30-40	
	4-8	Gravelly loam, channery loam, very channery loam	GM	A-1,A-2	0-15	35-55	30-50	30-45	20-35	30-40	
-Rock outcrop	Not rated										
808-Nielsen	0-9	Extremely stony loam, very flaggy loam	GM-GC, SM-SC	A-4,A-2	25-75	50-80	30-60	25-50	20-40	25-30	5-10
	9-19	Very flaggy clay loam, very channery loam, very flaggy sandy clay loam	GM-GC	A-2,A-1	25-75	50-80	30-50	25-40	20-30	25-30	5-10
-Nielsen Variant	0-8	Silty clay loam, clay loam	CL	A-6,A-7	0-5	90-100	85-100	80-95	75-90	30-45	10-20
	8-15	Clay, silty clay, silty clay loam	CL	A-6,A-7	0-5	85-95	80-90	75-85	70-80	35-50	15-25
-Rock outcrop	Not rated										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3" (%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
810-Gilispie	0-19	Cobbly clay loam, gravelly clay loam	CL,GC	A-6	10-25	65-80	65-80	50-70	40-65	30-40	10-15
-Bachus	0-17	Loam	ML, CL-ML	A-4	0-5	80-100	80-100	70-85	50-70	<25	NP-5
	17-31	Loam, clay loam	CL	A-6	0-10	80-100	80-100	75-90	60-75	30-35	11-15
-Nielsen	See Nielsen, Map Unit 808										
812-Bachus	See Bachus, Map Unit 810										
-Mayoworth	0-7	Clay loam	CL	A-6	0	85-100	85-100	70-100	65-90	25-30	10-15
	7-12	Silty clay loam, clay loam	CL	A-6,A-7	0	90-100	90-100	85-95	85-95	35-45	15-25
	12-27	Clay, clay loam	CL	A-7	0	85-100	85-100	70-100	65-85	40-50	20-30
	27-34	Clay loam	CL	A-6,A-7	0	85-100	85-100	65-90	55-80	35-45	15-20
813-Cryoborolls	Too variable to rate										
-Cryorthents	Too variable to rate										
814-Mayoworth	See Mayoworth, Map Unit 812										
-Burnette	0-2	Loam	CL	A-6	0-5	90-100	90-100	85-95	60-75	25-35	10-15
	2-16	Clay loam	CL	A-6	0-5	90-100	90-100	90-100	70-80	35-40	15-20
	16-36	Clay loam, clay	CH,CL	A-7	0-5	90-100	90-100	90-100	75-95	40-55	>20
	36-60	Clay loam	CL	A-6	0-5	90-100	90-100	90-100	70-95	35-40	>20
-Nielsen Variant	See Nielsen Variant, Map Unit 808										
815-Bridger	0-9	Cobbly loam, cobbly clay loam	CL,ML, CL-ML	A-6,A-4	25-40	85-95	80-90	70-85	50-70	20-30	4-15
	9-24	Clay, clay loam	CL	A-6,A-7	0	95-100	95-100	90-95	75-90	30-45	15-25
	24-36	Gravelly clay loam, very gravelly clay loam	GM-GC, GC,CL, CL-ML	A-6	0-5	60-85	50-75	45-70	35-55	25-35	5-15
	36-60	Very gravelly clay loam	GM-GC, GC	A-2,A-4	5-10	40-65	40-65	30-60	25-40	25-35	5-15
-Nielsen Variant	See Nielsen Variant, Map Unit 808										
816-Nielsen	See Nielsen, Map Unit 808										
-Millerlake	0-16	Loam	CL-ML	A-4	0-5	85-100	80-95	70-90	50-65	20-30	5-10
	16-47	Clay loam, loam	CL-ML, CL	A-4,A-6	5-20	85-100	75-95	70-90	50-75	20-35	5-15
	47-60	Sand and gravel	GP	A-1	10-25	40-50	20-30	5-10	0-5		NP

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
818-Nielsen	See Nielsen, Map Unit 808										
-Gilispie	See Gilispie, Map Unit 810										
820-Bachus	See Bachus, Map Unit 810										
-Wix	0-8	Sandy loam, fine sandy loam	SM, SM-SC	A-2 A-4,A-1	0-5	85-100	75-100	45-70	20-40	15-25	NP-10
	8-22	Sandy clay loam, clay loam	CL	A-6	0-5	85-100	75-100	70-100	50-80	25-40	15-25
	22-30	Gravelly sandy loam, gravelly sandy clay loam	SM, SM-SC	A-2,A-1	0-5	65-80	50-75	35-50	15-30	20-30	NP-15
822-Starley	See Starley, Map Unit 806										
-Bachus	See Bachus, Map Unit 810										
-Starman	See Starman, Map Unit 802										
850-Millerlake	See Millerlake, Map Unit 816										
-Adel	0-10	Loam	CL, CL-ML	A-4	0-10	85-100	85-100	80-95	65-80	25-30	5-10
	10-48	Loam, clay loam	CL, CL-ML	A-4,A-6	0-10	85-100	85-100	80-95	65-80	25-40	5-15
	48-60	Clay loam	CL	A-6	10-15	85-100	85-100	75-95	70-80	25-40	10-20
854-Burnette	See Burnette, Map Unit 814										
-Millerlake	See Millerlake, Map Unit 816										
870-Wix	See Wix, Map Unit 820										
-Judkins	0-9	Extremely stony loam, extremely stony silt loam	SM,GM, SM-SC, GM-GC	A-4	25-65	65-90	60-80	50-75	35-50	20-30	NP-10
	9-39	Extremely stony loam, very stony loam, extremely stony clay loam, extremely stony silty clay loam	CL-ML, CL,SC, SM-SC	A-4,A-6	50-85	75-90	60-80	50-80	40-70	25-40	5-15
872-Burnette -Nielsen Variant	See Nielsen Variant, Map Unit 808										

Soil name and map symbol	Depth (in.)	USDA texture	Classification United	Classification AASHO	Frag-ments >3"(%)	Percentage passing sieve number: 4	10	40	200	Liquid limit (%)	Plas-ticity index
876-Wetterhorn	0-20	Stony loam, very stony loam	CL-ML, SM-SC	A-4	25-40	70-85	75-85	65-70	45-55	20-30	5-10
	20-36	Stony clay loam	CL,CH	A-6,A-7	25-40	80-90	75-90	60-65	50-55	30-55	10-30
-Wetterhorn Variant	0-6	Stony clay loam	CL,CH	A-6,A-7	30-50	45-75	40-70	35-70	30-55	30-55	10-30
	6-32	Stony clay, stony silty clay	GC	A-7	30-50	35-65	30-60	30-60	25-60	30-55	15-35
902-Samsil	See Samsil, Map Unit 753										
-Shingle	See Shingle, Map Unit 71										
-Rock outcrop	Not rated										

Table 5. Physical And Chemical Properties Of Soils.
(The sumbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile. Wind erodibility group and organic matter are for the surface layer. Absence of an entry means data were not available or were not estimated).

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/HR	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
11-Larimer loam	0-7	10-27	2.0-6.0	.13-.15	6.6-7.9		Low	.24	3	6	1-3
	7-22	15-35	0.6-2.0	.16-.18	6.6-8.4		Moderate	.32			
	22-30	15-25	2.0-6.0	.11-.13	7.9-9.0	< 2	Low	.17			
	30-60	0-5	> 20.	.03-.05	7.9-8.4	< 2	Low	.10			
11L-Larimer sandy loam	0-7	5-15	2.0-6.0	.08-.13	6.6-7.9		Low	.23	3	3	1-3
	7-22	15-35	0.6-2.0	.16-.18	6.6-8.4		Moderate	.32			
	22-30	10-20	2.0-6.0	.13-.17	7.9-9.0	< 2	Low	.17			
	30-60	0-5	> 20.	.03-.05	7.9-8.4	< 2	Low	.10			
11T-Garland	0-4	18-27	0.6-2.0	.16-.18	7.4-8.4	2-4	Low	.32	4	6	
	4-21	25-35	0.6-2.0	.19-.21	7.4-9.0	2-4	Moderate	.28			
	21-30	20-30	0.6-2.0	.14-.16	7.9-9.0	2-4	Moderate	.28			
	30-60	0-5	> 6.0	.03-.05	7.9-8.4	< 2	Low	.10			
-Preatorson	0-3	10-18	2.0-6.0	.08-.11	6.6-8.4	2-4	Low	.28	1	3	
	3-15	20-35	2.0-6.0	.05-.10	6.6-8.4	2-4	Low	.17			
	15-60	0-10	> 6.0	.03-.05	7.9-8.9	2-4	Very low	.10			
45-Youngston	0-4	18-35	0.6-2.0	.19-.21	7.4-8.4	< 2	Moderate	.37	5	4L	
	4-60	18-35	0.6-2.0	.19-.21	7.9-9.0	2-8	Moderate	.37			
-Glenton	0-10	18-35	0.6-2.0	.19-.21	7.4-9.0	< 4	Moderate	.32	5	4L	
	10-60	18-35	0.6-2.0	.11-.16	7.9-9.0	< 4	Moderate	.32			
46-Petrie	0-4	27-40	.06-0.2	.19-.21	> 8.0	2-4	High	.49	5	4	
	4-60	35-59	< .06	.14-.21	> 8.0	4-8	High	.49			
-Kim alkali	0-4	18-35	0.6-2.0	.16-.18	7.9-9.0	4-8	Moderate	.32	5	4L	
	4-16	18-35	0.6-2.0	.16-.18	8.5-9.0	4-8	Moderate	.32			
	16-60	18-35	0.6-2.0	.15-.17	7.9-9.0	4-16	Moderate	.32			

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
47-Petrie	See Petrie, Map Unit 46										
-Cadoma	0-4	20-27	0.2-0.6	.14-.16	> 7.8	> 4	Moderate	.37	3	4L	
	4-34	35-60	.06-0.2	.08-.10	> 7.8	> 16	High	.37			
-Epsie	0-3	40-60	< .06	.08-.12	7.4-8.4	> 4	High	.32	3	4	
	3-16	50-60	< .06	.08-.12	7.9-8.9	> 4	High	.32			
	16-28	50-60	< .06	.08-.12	7.9-8.9	> 4	High	.32			
60-Cadoma	See Cadoma, Map Unit 47										
-Kim	See Kim, Map Unit 69										
67-Cadoma	See Cadoma, Map Unit 47										
-Arvada	0-4	10-20	2.0-6.0	.13-.15	7.4-9.0	< 4	Low	.24	5	3	
	4-14	35-60	< .06	.07-.09	> 8.4	< 4	High	.32			
	14-60	30-40	.06-0.2	.09-.11	> 8.4	< 8	High	.32			
-Worfka	0-2	25-40	0.2-0.6	.17-.21	6.6-8.4	< 2	Moderate	.32	2	6	
	2-19	30-50	.06-0.2	.19-.21	7.4-9.0	< 2	Moderate	.37			
68-Cadoma	See Cadoma, Map Unit 47										
-Epsie	See Epsie, Map Unit 47										
69-Kim	0-6	18-35	0.6-2.0	.16-.18	7.9-8.4		Low	.32	5	4L	
	6-60	18-35	0.6-2.0	.15-.17	7.9-8.9	< 8	Moderate	.32			
70-Cadoma	See Cadoma, Map Unit 47										
71-Cadoma	See Cadoma, Map Unit 47										
-Shingle	0-4	18-35	0.6-2.0	.16-.18	7.4-9.0	< 2	Low	.32	2	4L	
	4-15	18-35	0.6-2.0	.16-.21	7.4-9.0	< 2	Moderate	.32			
72-Absted	0-3	15-30	2.0-6.0	.15-.17	6.6-7.8	2-4	Moderate	.32	4	4L	
	3-60	35-50	.06-0.2	.11-.13	> 7.9	>16	High	.55			
-Arvada	See Arvada, Map Unit 67										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
73-Absted	See Absted, Map Unit 72										
-Stoneham	0-4	15-30	0.6-2.0	.16-.18	6.6-7.8		Low	.20	5	4L	
	4-9	25-40	0.6-2.0	.14-.18	7.4-8.4		Moderate	.20			
	9-40	18-35	0.6-2.0	.14-.18	7.9-8.4	< 2	Moderate	.20			
	40-60	10-20	2.0-6.0	.08-.12	7.9-8.4	< 2	Low	.17			
-Ulm	0-9	15-35	0.6-2.0	.16-.18	6.6-7.3		Low	.32	5	6	
	9-26	35-50	.06-0.2	.19-.21	7.4-8.4	< 2	High	.37			
	26-60	20-40	0.6-2.0	.19-.21	7.9-8.9	< 2	Moderate	.37			
74-Petrie	See Petrie, Map Unit 46										
-Ulm	See Ulm, Map Unit 73										
75-Arvada	See Arvada, Map Unit 67										
-Kim alkali	See Kim, Map Unit 46										
93-Vona	0-8	5-15	2.0-6.0	.11-.13	6.6-7.8	< 2	Low	.15	5	3	
	8-30	8-18	2.0-6.0	.12-.14	6.6-8.4	< 4	Low	.20			
	30-60	5-15	6.0-20.	.08-.11	7.9-9.0	< 4	Low	.15			
-Olney	0-8	10-20	0.6-6.0	.11-.15	6.6-7.8		Low	.20	5	3	
	8-16	18-35	0.6-2.0	.13-.15	6.6-7.8		Moderate	.24			
	16-22	15-30	0.6-6.0	.11-.15	7.9-8.4	< 2	Low	.24			
	22-60	5-20	2.0-6.0	.06-.13	7.9-9.0	< 2	Low	.15			
102-Rock outcrop	Not rated										
109-Epsie	See Epsie, Map Unit 47										
-Rock outcrop	Not rated										
110-Shingle	See Shingle, Map Unit 71										
-Tassel	0-15	5-18	2.0-6.0	.16-.18	7.4-8.4		Low	.24	1	3	
111-Rock outcrop	Not rated										
-Shingle	See Shingle, Map Unit 71										
-Tassel	See Tassel, Map Unit 110										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
112-Oceanet	0-14	5-18	2.0-6.0	.07-.13	7.4-9.0	< 2	Low	.24	1	3	
-Persayo	0-14	18-35	0.2-0.6	.15-.19	7.9-9.0	< 8	Moderate	.37	1	4L	
-Rock outcrop	Not rated										
190-Epsie	See Epsie, Map Unit 47										
-Shingle	See Shingle, Map Unit 71										
192-Cadoma	See Cadoma, Map Unit 47										
-Shingle	See Shingle, Map Unit 71										
-Rock outcrop	Not rated										
243-Kim	See Kim, Map Unit 69										
-Kim alkali	See Kim alkali, Map Unit 46										
244-Kim alkali	See Kim alkali, Map Unit 46										
245-Orella	0-3	38-65	.06-0.2	.09-.11	7.9-9.0		High	.49	1	4	
	3-18	38-65	< .06	.09-.11	8.5-9.5		High	.49			
246-Orella	See Orella, Map Unit 245										
-Epsie	See Epsie, Map Unit 47										
-Rock outcrop	Not rated										
247-Torriorthents, severely eroded	Too variable to rate										
315-Persayo	See Persayo, Map Unit 112										
-Clifterson	0-4	18-35	2.0-6.0	.09-.13	7.9-8.4	< 2	Low	.28	5	4L	
	4-60	10-35	6.0-20.	.04-.09	7.9-8.4	< 2	Low	.24			

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
322-Nihill	0-8	10-30	0.6-2.0	.12-.16	7.4-7.8		Low	.24	2	5	
	8-60	10-30	2.0-6.0	.07-.09	7.4-8.4	<4	Low	.20			
-Shingle	See Shingle, Map Unit 71										
323-Nihill	See Nihill, Map Unit 322										
324-Larimer	See Larimer, Map Unit 11										
-Nihill	See Nihill, Map Unit 322										
325-Larimer	See Larimer, Map Unit 11										
-Stoneham	See Stoneham, Map Unit 73										
-Nihill	See Nihill, Map Unit 322										
345-Vona	See Vona, Map Unit 93										
-Otero	0-14	5-18	6.0-20.	.09-.13	7.0-8.4	<2	Low	.10	5	2	
	14-60	5-18	6.0-20.	.08-.12	7.4-8.4	<4	Low	.10			
346-Nelson	0-9	5-18	2.0-6.0	.13-.15	7.9-8.4	<2	Low	.20	2	3	
	9-30	5-18	2.0-6.0	.11-.13	7.9-8.4	<2	Low	.20			
-Terry	0-5		2.0-6.0	.13-.15	7.0-7.8		Low	.20	2	3	
	5-14		2.0-6.0	.13-.15	7.4-7.8		Low	.20			
	14-26		2.0-6.0	.13-.15	7.9-8.4		Low	.20			
-Otero	See Otero, Map Unit 345										
360-Stoneham	See Stoneham, Map Unit 73										
-Kim	See Kim, Map Unit 69										
371-Pavillion	0-11	15-30	0.6-2.0	.15-.17	7.4-9.0	2-4	Low	.24	3	4L	
	11-26	18-35	0.6-2.0	.16-.18	7.4-9.0	2-4	Moderate	.30			
-Persayo	See Persayo, Map Unit 112										
372-Tassel	See Tassel, Map Unit 110										
-Nelson	See Nelson, Map Unit 346										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
373-Neville	0-10	10-20	0.6-2.0	.13-.18	7.4-8.4		Low	.28	5	3	
	10-60	18-35	0.6-2.0	.15-.18	7.9-8.4		Low	.37			
-Tensleep	0-2	10-25	0.6-2.0	.15-.17	6.6-7.3		Low	.43	5	3	
	2-7	18-35	0.6-2.0	.19-.21	6.6-7.8		Moderate	.49			
	7-60	15-30	0.6-2.0	.15-.17	7.9-9.0	< 2	Low	.55			
375-Bowbac	0-3	5-18	2.0-6.0	.13-.15	6.6-7.4	< 2	Low	.26	3	3	
	3-14	18-35	0.6-2.0	.16-.18	6.6-7.4	< 2	Moderate	.32			
	14-30	18-35	0.6-2.0	.16-.18	7.4-8.4	< 2	Moderate	.32			
-Olney	See Olney, Map Unit 93										
-Arvada	See Arvada, Map Unit 67										
382-Rock outcrop	Not rated										
-Tassel	See Tassel, Map Unit 110										
383-Rock outcrop	Not rated										
-Tassel	See Tassel, Map Unit 110										
-Nelson	See Nelson, Map Unit 346										
389-Spearfish	0-8	18-35	0.6-2.0	.16-.22	6.6-8.4		Low	.32	1	4L	
	8-16	18-35	0.6-2.0	.15-.20	7.4-8.4		Low	.32			
-Neville	See Neville, Map Unit 373										
393-Olney	See Olney, Map Unit 93										
-Bowbac	See Bowbac, Map Unit 375										
394-Saddle	0-2	15-25	0.6-6.0	.08-.17	7.4-8.4	< 4	Low	.32	3	3	
	2-10	20-30	0.2-2.0	.13-.19	7.4-8.4	< 4	Moderate	.28			
	10-24	18-28	0.2-2.0	.13-.19	7.9-9.0	< 4	Moderate	.28			
-Oceanet	See Oceanet, Map Unit 112										
398-Tassel	See Tassel, Map Unit 110										
-Bowbac	See Bowbac, Map Unit 375										
-Terry	See Terry, Map Unit 346										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
410-Bondman	0-3	10-20	2.0-6.0	.13-.15	6.6-7.8	<2	Low	.20	1	3	
	3-12	20-30	0.6-2.0	.14-.16	7.4-7.8	<2	Moderate	.24			
	12-18	10-20	2.0-6.0	.11-.13	7.4-7.8	<2	Low	.20			
-Worfka	See Worfka, Map Unit 67										
-Worf	0-14		0.6-2.0	.16-.18	6.6-8.4	<2	Moderate	.28	2	6	
411-Bondman	See Bondman, Map Unit 410										
-Rock outcrop	Not rated										
-Worf	See Worf, Map Unit 410										
426-Larim	0-4	10-20	0.6-2.0	.13-.15	6.6-7.4	<2	Low	.24	2	5	
	4-15	25-35	0.6-2.0	.12-.14	6.6-9.0	<2	Moderate	.24			
	15-60	0-10	20.	.03-.05	7.9-9.0	<2	Low	.10			
-Larimer	See Larimer, Map Unit 11										
445-Rekop	0-4	18-35	0.6-2.0	.16-.18	7.9-9.0	2-4	Low	.37	1	4L	
	4-16	18-35	0.6-2.0	.12-.18	7.9-9.0	2-4	Low	.43			
-Gystrum	0-4	15-30	0.6-2.0	.19-.21	7.4-8.4	2-4	Low	.43	2	4L	
	4-27	18-35	0.6-2.0	.19-.21	7.9-9.0	>2	Moderate	.49			
446-Rock outcrop	Not rated										
-Travessilla	0-8	5-18	0.6-2.0	.09-.17	7.4-8.9	<2	Low	.32	1	4L	
-Spearfish	See Spearfish, Map Unit 389										
447-Travessilla	See Travessilla, Map Unit 446										
448-Torrifluvents saline	Too variable to rate										
449-Travessilla	See Travessilla, Map Unit 446										
-Rock outcrop	Not rated										
450-Torrifluvents	Too variable to rate										
-Fluvaquents	Too variable to rate										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
490-Shingle	See Shingle, Map Unit 71										
-Thedalund	0-4	15-30	0.6-2.0	.16-.18	7.9-8.4		Low	.32	2	4L	
	4-30	18-35	0.6-2.0	.16-.18	7.9-8.4	< 8	Moderate	.32			
546-Spearfish	See Spearfish, Map Unit 389										
-Rock outcrop	Not rated										
-Neville	See Neville, Map Unit 373										
572-Worland	0-30		2.0-6.0	.11-.13	7.9-8.4	2-4	Low	.20	3	3	
-Oceanet	See Oceanet, Map Unit 112										
590-Shingle	See Shingle, Map Unit 71										
-Rock outcrop	Not rated										
601-Youngston	See Youngston, Map Unit 45										
-Uffens	0-3	15-25	0.2-0.6	.13-.15	> 8.4	> 16	Low	.49	1	4L	
	3-60	18-35	0.2-0.6	.14-.16	> 8.4	> 16	Moderate	.24			
-Glenton	See Glenton, Map Unit 45										
602-Binton	0-60	18-35	.06-0.2	.10-.14	> 8.5	2-8	Moderate	.32	5	4L	
-Uffens	See Uffens, Map Unit 601										
604-Effington	0-3	25-40	0.2-0.6	.09-.11	> 8.4	> 8	Moderate	.37	5	4L	
	3-19	35-55	.06-0.2	.07-.09	> 9.0	> 8	High	.32			
	19-60	25-40	0.2-0.6	.09-.11	> 8.4	> 8	Moderate	.49			
-Effington Variant	0-30	30-60	.06-0.2	.08-.10	8.0-9.2	> 8	High	.32	3	4	
606-Hoot	0-16	20-35	0.2-0.6	.05-.07	6.6-8.6	< 2	Low	.15	1	8	
-Rock outcrop	Not rated										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	T	Wind Erodibility Group	Organic Matter PCT.
645-Mudray	0-2	15-25	2.0-6.0	.11-.13	> 7.8	< 4	Low	.32	1	3	
	2-12	30-55	.06-0.2	.14-.16	> 9.0	< 4	High	.43			
	12-17	30-40	.06-0.2	.14-.16	> 9.0	< 4	Moderate	.37			
-Persayo	See Persayo, Map Unit 112										
-Effington Variant	See Effington Variant, Map Unit 604										
650-Mudray clay loam	0-2	25-35	0.6-2.0	.12-.14	> 7.8	< 4	Moderate	.34	3	4L	
	2-12	30-55	.06-0.2	.14-.16	> 9	< 4	High	.43			
	12-17	30-40	.06-0.2	.14-.16	> 9	< 4	Moderate	.37			
671-Rock outcrop	Not rated										
-Persayo	See Persayo, Map Unit 112										
675-Pavillion	See Pavillion, Map Unit 371										
-Youngston	See Youngston, Map Unit 45										
700-Stoneham	See Stoneham, Map Unit 73										
-Cushman	0-7	10-20	0.6-2.0	.16-.20	6.6-8.4		Low	.32	2	5	
	7-12	18-35	0.6-2.0	.14-.18	6.6-8.4		Moderate	.32			
	12-24	10-25	0.6-2.0	.14-.18	6.6-9.0	< 2	Low	.32			
701-Fort Collins	0-8	15-27	0.6-2.0	.16-.20	6.6-7.8		Low	.20	5	6	1-2
	8-18	18-35	0.6-2.0	.16-.18	6.6-7.8		Moderate	.20			
	18-60	12-27	0.6-2.0	.16-.18	7.9-9.0		Moderate	.20			
-Kim	See Kim, Map Unit 69										
702-Absted	See Absted, Map Unit 72										
-Fort Collins	See Fort Collins, Map Unit 701										
703-Fort Collins	See Fort Collins, Map Unit 701										
-Cushman	See Cushman, Map Unit 700										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
705-Kim	See Kim, Map Unit 69										
-Thedalund	See Thedalund, Map Unit 490										
706-Cushman	See Cushman, Map Unit 700										
-Terry	See Terry, Map Unit 346										
-Worf	See Worf, Map Unit 410										
708-Renohill	0-7	25-35	0.2-0.6	.17-.21	6.6-7.8		Moderate	.37	3	6	
	7-14	35-50	.06-0.2	.14-.16	6.6-8.4	< 2	High	.32			
	14-30	25-40	0.2-0.6	.19-.21	7.9-9.0	< 4	Moderate	.37			
-Cushman	See Cushman, Map Unit 700										
-Worfka	See Worfka, Map Unit 67										
709-Renohill	See Renohill, Map Unit 708										
-Cadoma	See Cadoma, Map Unit 47										
-Worfka	See Worfka, Map Unit 67										
710-Cadoma	See Cadoma, Map Unit 47										
-Renohill	See Renohill, Map Unit 708										
-Ulm	See Ulm, Map Unit 73										
720-Blazon	0-14	18-35	0.6-2.0	.16-.18	7.4-9.0	2-4	Low	.32	1	4L	
-Rock outcrop	Not rated										
722-Blazon	See Blazon, Map Unit 720										
723-Blazon	See Blazon, Map Unit 720										
-Delphill	0-3	18-35	0.6-2.0	.16-.20	7.4-8.4	< 4	Low	.37	2	5	
	3-28	18-35	0.6-2.0	.14-.20	7.9-9.0	< 4	Low	.37			

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
724-Blazon	See Blazon, Map Unit 720										
-Brownsto	0-10	10-20	2.0-6.0	.08-.12	7.9-8.9		Low	.18	5	3	
	10-60	10-20	2.0-6.0	.04-.08	7.9-8.9		Low	.12			
725-Blazon	See Blazon, Map Unit 720										
-Diamondville	0-7	15-30	0.6-2.0	.16-.18	6.6-7.8	< 2	Low	.37	3	6	
	7-20	18-35	0.6-2.0	.19-.21	7.4-8.4	< 2	Moderate	.49			
	20-28	15-30	0.6-2.0	.16-.18	7.9-8.4	< 2	Low	.49			
730-Forelle	0-4	15-30	0.6-2.0	.16-.18	6.6-7.8	< 2	Low	.28	5	6	
	4-20	18-35	0.6-2.0	.16-.21	6.6-8.4	< 2	Moderate	.32			
	20-60	15-30	0.6-2.0	.15-.17	7.9-9.0	< 2	Moderate	.28			
-Diamondville	See Diamondville, Map Unit 725										
732-Thermopolis	0-4	18-35	0.6-2.0	.15-.18	7.0-8.4	< 4	Low	.43	2	4L	
	4-15	18-35	0.6-2.0	.15-.18	7.4-8.4	< 4	Low	.55			
-Rock outcrop	Not rated										
735-Patent	0-60	18-35	0.6-2.0	.19-.21	7.4-9.4	< 2	Moderate	.32	5	4L	
-Forelle	See Forelle, Map Unit 730										
736-Forelle	See Forelle, Map Unit 730										
-Pinelli	0-3	20-35	0.6-2.0	.16-.18	6.6-7.8	2-4	Low	.32	5	6	
	3-21	35-50	0.2-0.6	.19-.21	6.6-8.4	2-4	High	.37			
	21-60	25-40	0.2-0.6	.19-.21	7.9-9.0	2-4	Moderate	.37			
737-Forelle	See Forelle, Map Unit 730										
-Alcova	0-3	15-30	0.6-2.0	.16-.18	6.6-7.8	< 2	Low	.32	5	6	
	3-18	18-35	0.6-2.0	.19-.21	6.6-8.4	< 2	Moderate	.32			
	18-25	18-35	0.6-2.0	.17-.19	6.6-8.4	< 2	Moderate	.32			
	25-60	5-15	> 6.0	.05-.07	6.6-8.4	< 2	Low	.10			

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
749-Renohill	See Renohill, Map Unit 708										
-Worfka	See Worfka, Map Unit 67										
750-Worfka	See Worfka, Map Unit 67										
-Cushman	See Cushman, Map Unit 700										
751-Worfka	See Worfka, Map Unit 67										
-Shingle	See Shingle, Map Unit 71										
-Rock outcrop	Not rated										
752-Epsie	See Epsie, Map Unit 47										
753-Gaynor	0-6	25-40	0.2-0.6	.14-.17	7.4-8.4		High	.24	2	4	
	6-30	35-50	.06-0.2	.12-.16	7.9-9.0	2-8	High	.32			
802-Rock outcrop	Not rated										
-Starman	0-4	18-35	0.6-2.0	.09-.11	7.4-9.0	< 2	Low	.24	1	4L	
	4-8	18-35	0.6-2.0	.09-.11	7.4-9.0	< 2	Low	.28			
804-Rock outcrop	Not rated										
-Merino	0-3	18-35	0.6-2.0	.06-.10	7.0-7.9	< 2	Low	.28	1	6	
	3-9	18-35	0.6-2.0	.06-.10	7.0-7.9	< 2	Low	.28			
	9-15	18-35	0.6-2.0	.06-.10	7.0-7.9	< 2	Low	.28			
806-Starley	0-9	18-35	0.6-2.0	.09-.12	6.6-8.4	< 2	Low	.24	1	6	
	9-15	18-35	0.6-2.0	.05-.12	7.9-9.0	< 2	Low	.20			
-Starman	See Starman, Map Unit 802										
-Rock outcrop	Not rated										
808-Nielsen	0-9	14-22	0.2-0.6	.12-.16	6.6-7.3		Low	.24	1	6	
	9-19	18-32	0.2-0.6	.12-.16	6.6-7.3		Low	.24			
-Nielsen Variant	0-8	30-40	0.2-0.6	.17-.19	6.1-7.4	< 2	Moderate	.24	1	4	
	8-15	35-55	.06-0.2	.15-.17	6.6-7.8	< 2	Moderate	.24			
-Rock outcrop	Not rated										

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
810-Gilispie	0-19	20-35	0.6-2.0	.15-.19	6.1-7.3	< 2	Low	.37	1	6	
-Bachus	0-17	15-30	0.6-2.0	.16-.18	5.6-7.0	< 2	Low	.32	2	6	
	17-31	18-35	0.6-2.0	.16-.18	5.6-7.0	< 2	Low	.32			
-Nielsen	See Nielsen, Map Unit 808										
812-Bachus	See Bachus, Map Unit 810										
-Mayoworth	0-7	27-35	0.6-2.0	.19-.21	6.1-7.8	< 2	Low	.37	2	6	
	7-12	38-45	0.2-0.6	.19-.21	6.1-7.8	< 2	Moderate	.43			
	12-27	35-45	.06-0.2	.14-.16	6.1-7.8	< 2	High	.37			
	27-34	30-40	0.2-0.6	.19-.21	6.1-7.8	< 2	Moderate	.37			
813-Cryoborolls	Too variable to rate										
-Cryorthents	Too variable to rate										
814-Mayoworth	See Mayoworth, Map Unit 812										
-Burnette	0-2	18-35	0.6-2.0	.16-.18	6.6-7.3	< 2	Low	.28	5	6	
	2-16	30-45	0.2-0.6	.19-.21	6.6-7.3	< 2	Moderate	.32			
	16-36	36-45	0.2-0.6	.14-.16	6.6-7.9	< 2	High	.24			
	36-60	30-40	0.2-0.6	.19-.21	7.9-8.4	< 2	Moderate	.32			
-Nielsen Variant	See Nielsen Variant, Map Unit 808										
815-Bridger	0-9	15-25	0.6-2.0	.11-.15	6.6-7.3	< 2	Low	.28	5	5	
	9-24	35-50	0.6-2.0	.13-.16	6.6-7.8	< 2	Moderate	.37			
	24-36	25-40	0.6-2.0	.12-.15	7.9-8.4	< 2	Low	.28			
	36-60	15-25	0.6-2.0	.08-.15	7.9-8.4	< 2	Low	.28			
-Nielsen Variant	See Nielsen Variant, Map Unit 808										
816-Nielsen	See Nielsen, Map Unit 808										
-Millerlake	0-16	10-20	0.6-2.0	.16-.18	6.1-7.4		Low	.20	4	5	
	16-47	18-35	0.6-2.0	.14-.16	6.1-7.9		Moderate	.28			
	47-60	0-10	6.0-20.	.04-.08	6.1-7.9		Low	.10			

Soil Name And Map Symbol	Depth (in)	Clay PCT.	Permeability In/Hr	Avail. Water Capacity In/In	Soil Reaction	Salinity mmhos/cm	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Wind Erodibility Group	Organic Matter PCT.
818-Nielsen	See Nielsen, Map Unit 808										
-Gilispie	See Gilispie, Map Unit 810										
820-Bachus	See Bachus, Map Unit 810										
-Wix	0-8	10-15	2.0-6.0	.10-.13	6.1-7.8		Low	.15	2	5	
	8-22	20-35	0.6-2.0	.13-.16	6.1-7.3		Moderate	.24			
	22-30	10-15	2.0-6.0	.07-.09	6.1-7.3		Low	.10			
822-Starley	See Starley, Map Unit 806										
-Bachus	See Bachus, Map Unit 810										
-Starman	See Starman, Map Unit 802										
850-Millerlake	See Millerlake, Map Unit 816										
-Adel	0-10	10-20	0.6-2.0	.18-.20	6.1-6.5		Low	.28	5	5	
	10-48	20-30	0.6-2.0	.14-.18	6.1-7.3		Low	.43			
	48-60	30-40	0.6-2.0	.14-.18	6.1-7.8		Low	.43			
854-Burnette	See Burnette, Map Unit 814										
-Millerlake	See Millerlake, Map Unit 816										
870-Wix	See Wix, Map Unit 820										
-Judkins	0-9	15-20	0.6-2.0	.06-.07	5.1-7.0		Low	.28	2	5	
	9-31	25-30	0.6-2.0	.06-.07	5.1-7.6		Low	.28			
872-Burnette	See Burnette, Map Unit 814										
-Nielsen Variant	See Nielsen Variant, Map Unit 808										
-Rock outcrop	Not rated										
876-Wetterhorn	0-20	20-30	0.6-2.0	.10-.15	5.6-7.0		Low	.24	2	8	
	20-36	35-50	.06-0.2	.08-.12	5.6-7.0		Moderate	.28			
-Wetterhorn Variant	0-6	25-40	0.6-2.0	.10-.15	5.6-7.0		Low	.24	2	8	
	6-32	35-60	.06-0.2	.05-.10	5.6-7.0		Moderate	.20			
902-Samsil	0-17	35-50	.06-0.2	.08-.12	7.4-8.4		High	.28	2	4	
-Shingle	See Shingle, Map Unit 71										
-Rock outcrop	Not rated										

Table 6. Water Features

Absence of an entry indicates the feature is not a concern.

Soil name and map symbol	Hydro-logic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
11-Larimer loam	B	none	-	-	>6.0	-	-
11L-Larimer sandy loam	B	none	-	-	>6.0	-	-
11T-Garland	B	none	-	-	>6.0	-	-
-Preatorson	B	none	-	-	>6.0	-	-
45-Youngston	B	none	-	-	>6.0	-	-
-Glenton	B	none	-	-	>6.0	-	-
46-Petrie	D	none	-	-	>6.0	-	-
-Kim	B	none	-	-	>6.0	-	-
47-Petrie	D	none	-	-	>6.0	-	-
-Cadoma	C	none	-	-	>6.0	-	-
-Epsie	D	none	-	-	>6.0	-	-
60-Cadoma	C	none	-	-	>6.0	-	-
-Kim	B	none	-	-	>6.0	-	-
67-Cadoma	C	none	-	-	>6.0	-	-
-Arvada	D	none	-	-	>6.0	-	-
-Worfka	D	none	-	-	>6.0	-	-
68-Cadoma	C	none	-	-	>6.0	-	-
-Epsie	D	none	-	-	>6.0	-	-
69-Kim	B	none	-	-	>6.0	-	-
70-Cadoma	C	none	-	-	>6.0	-	-
71-Cadoma	C	none	-	-	>6.0	-	-
-Shingle	D	none	-	-	>6.0	-	-
72-Absted	D	none	-	-	>6.0	-	-
-Arvada	D	none	-	-	>6.0	-	-

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
73-Absted	D	none	-	-	>6.0	-	-
-Stoneham	D	none	-	-	>6.0	-	-
-Ulm	C	none	-	-	>6.0	-	-
74-Petrie	D	none	-	-	>6.0	-	-
-Ulm	C	none	-	-	>6.0	-	-
75-Arvada	D	none	-	-	>6.0	-	-
-Kim alkali	B	none	-	-	>6.0	-	-
93-Vona	B	none	-	-	>6.0	-	-
-Olney	B	none	-	-	>6.0	-	-
102-Rock outcrop	Not rated						
109-Epsie	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
110-Shingle	D	none	-	-	>6.0	-	-
-Tassel	D	none	-	-	>6.0	-	-
111-Rock outcrop	Not rated						
-Shingle	D	none	-	-	>6.0	-	-
-Tassel	D	none	-	-	>6.0	-	-
112-Oceanet	D	none	-	-	>6.0	-	-
-Persayo	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
190-Epsie	D	none	-	-	>6.0	-	-
-Shingle	D	none	-	-	>6.0	-	-
192-Cadoma	C	none	-	-	>6.0	-	-
-Shingle	D	none	-	-	>6.0	-	-
243-Kim alkali	B	none	-	-	>6.0	-	-
-Kim loam	B	none	-	-	>6.0	-	-
244-Kim alkali	B	none	-	-	>6.0	-	-
245-Orella	D	none	-	-	>6.0	-	-

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
246-Orella	D	none	-	-	>6.0	-	-
-Epsie	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
247-Torriorthents	Too variable to rate						
315-Persayo	D	none	-	-	>6.0	-	-
-Clifterson	B	none	-	-	>6.0	-	-
322-Nihill	B	none	-	-	>6.0	-	-
-Shingle	D	none	-	-	>6.0	-	-
323-Nihill	B	none	-	-	>6.0	-	-
324-Larimer	B	none	-	-	>6.0	-	-
-Nihill	B	none	-	-	>6.0	-	-
325-Larimer	B	none	-	-	>6.0	-	-
-Stoneham	B	none	-	-	>6.0	-	-
-Nihill	B	none	-	-	>6.0	-	-
345-Vona	B	none	-	-	>6.0	-	-
-Otero	B	none	-	-	>6.0	-	-
346-Nelson	B	none	-	-	>6.0	-	-
-Terry	B	none	-	-	>6.0	-	-
-Otero	B	none	-	-	>6.0	-	-
360-Stoneham	B	none	-	-	>6.0	-	-
-Kim	B	none	-	-	>6.0	-	-
371-Pavillion	B	none	-	-	>6.0	-	-
-Persayo	D	none	-	-	>6.0	-	-
372-Tassel	D	none	-	-	>6.0	-	-
-Nelson	B	none	-	-	>6.0	-	-
373-Neville	B	none	-	-	>6.0	-	-
-Tensleep	B	none	-	-	>6.0	-	-

Soil name and map symbol	Hydro-logic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
375-Bowbac	B	none	-	-	>6.0	-	-
-Olney	B	none	-	-	>6.0	-	-
-Arvada	D	none	-	-	>6.0	-	-
382-Rock outcrop	Not rated						
-Tassel	D	none	-	-	>6.0	-	-
383-Rock outcrop	Not rated						
-Tassel	D	none	-	-	>6.0	-	-
-Nelson	B	none	-	-	>6.0	-	-
389-Spearfish	B	none	-	-	>6.0	-	-
-Neville	B	none	-	-	>6.0	-	-
393-Olney	B	none	-	-	>6.0	-	-
-Bowbac	B	none	-	-	>6.0	-	-
394-Saddle	C	none	-	-	>6.0	-	-
-Oceanet	D	none	-	-	>6.0	-	-
398-Tassel	D	none	-	-	>6.0	-	-
-Bowbac	B	none	-	-	>6.0	-	-
-Terry	B	none	-	-	>6.0	-	-
410-Bondman	C	none	-	-	>6.0	-	-
-Worfka	D	none	-	-	>6.0	-	-
-Worf	D	none	-	-	>6.0	-	-
411-Bondman	C	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
-Worf	D	none	-	-	>6.0	-	-
426-Larim	A	none	-	-	>6.0	-	-
-Larimer	B	none	-	-	>6.0	-	-
445-Rekop	D	none	-	-	>6.0	-	-
-Gystrum	C	none	-	-	>6.0	-	-

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
446-Rock outcrop	Not rated						
-Travessilla	D	none	-	-	>6.0	-	-
-Spearfish	B	none	-	-	>6.0	-	-
447-Travessilla	D	none	-	-	>6.0	-	-
448-Torrifluvents	Too variable to rate						
449-Travessilla	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
450-Torrifluvents	Too variable to rate						
-Fluvaquents	Too variable to rate						
490-Shingle	D	none	-	-	>6.0	-	-
-Thedalund	C	none	-	-	>6.0	-	-
546-Spearfish	B	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
-Neville	B	none	-	-	>6.0	-	-
572-Worland	B	none	-	-	>6.0	-	-
-Oceanet	D	none	-	-	>6.0	-	-
590-Shingle	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
601-Youngston	B	none	-	-	>6.0	-	-
-Uffens	D	none	-	-	>6.0	-	-
-Glenton	B	none	-	-	>6.0	-	-
602-Binton	C	none	-	-	>6.0	-	-
-Uffens	D	none	-	-	>6.0	-	-
604-Effington	D	none	-	-	>6.0	-	-
-Effington Variant	D	none	-	-	>6.0	-	-
606-Hoot	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
645-Mudray	D	none	-	-	>6.0	-	-
-Persayo	D	none	-	-	>6.0	-	-
-Effington Variant	D	none	-	-	>6.0	-	-
650-Mudray	D	none	-	-	>6.0	-	-
671-Rock outcrop	Not rated						
-Persayo	D	none	-	-	>6.0	-	-
675-Pavillion	B	none	-	-	>6.0	-	-
-Youngston	B	none	-	-	>6.0	-	-
700-Stoneham	B	none	-	-	>6.0	-	-
-Cushman	C	none	-	-	>6.0	-	-
701-Fort Collins	B	none	-	-	>6.0	-	-
-Kim	B	none	-	-	>6.0	-	-
702-Absted	D	none	-	-	>6.0	-	-
-Fort Collins	B	none	-	-	>6.0	-	-
703-Fort Collins	B	none	-	-	>6.0	-	-
-Cushman	C	none	-	-	>6.0	-	-
705-Kim	B	none	-	-	>6.0	-	-
-Thedalund	C	none	-	-	>6.0	-	-
706-Cushman	C	none	-	-	>6.0	-	-
-Terry	B	none	-	-	>6.0	-	-
-Worf	D	none	-	-	>6.0	-	-
708-Renohill	C	none	-	-	>6.0	-	-
-Cushman	C	none	-	-	>6.0	-	-
-Worfka	D	none	-	-	>6.0	-	-
710-Cadoma	C	none	-	-	>6.0	-	-
-Renohill	C	none	-	-	>6.0	-	-
-Ulm	C	none	-	-	>6.0	-	-
720-Blazon	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
722-Blazon	D	none	-	-	>6.0	-	-
723-Blazon	D	none	-	-	>6.0	-	-
-Delphill	C	none	-	-	>6.0	-	-
724-Blazon	D	none	-	-	>6.0	-	-
-Brownsto	B	none	-	-	>6.0	-	-
725-Blazon	D	none	-	-	>6.0	-	-
-Diamondville	C	none	-	-	>6.0	-	-
730-Forelle	B	none	-	-	>6.0	-	-
-Diamondville	C	none	-	-	>6.0	-	-
732-Thermopolis	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
735-Patent	B	none	-	-	>6.0	-	-
-Forelle	B	none	-	-	>6.0	-	-
736-Forelle	B	none	-	-	>6.0	-	-
-Pinelli	B	none	-	-	>6.0	-	-
737-Forelle	B	none	-	-	>6.0	-	-
-Alcova	B	none	-	-	>6.0	-	-
749-Renohill	C	none	-	-	>6.0	-	-
-Worfka	D	none	-	-	>6.0	-	-
750-Worfka	D	none	-	-	>6.0	-	-
-Cushman	C	none	-	-	>6.0	-	-
751-Worfka	D	none	-	-	>6.0	-	-
-Shingle	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
752-Epsie	D	none	-	-	>6.0	-	-
753-Gaynor	C	none	-	-	>6.0	-	-
-Samsil	D	none	-	-	>6.0	-	-

Soil name and map symbol	Hydro-logic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
802-Rock outcrop	Not rated						
-Starman	D	none	-	-	>6.0	-	-
804-Rock outcrop	Not rated						
-Merino	D	none	-	-	>6.0	-	-
806-Starley	D	none	--	-	>6.0	-	-
-Starman	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
808-Nielsen	D	none	-	-	>6.0	-	-
-Nielsen Variant	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
810-Gilispie	D	none	-	-	>6.0	-	-
-Bachus	C	none	-	-	>6.0	-	-
-Nielsen	D	none	-	-	>6.0	-	-
812-Bachus	C	none	-	-	>6.0	-	-
-Mayoworth	C	none	-	-	>6.0	-	-
813-Cryoborolls	Too variable to rate						
-Cryorthents	Too variable to rate						
814-Mayoworth	C	none	-	-	>6.0	-	-
-Burnette	B	none	-	-	>6.0	-	-
-Nielsen Variant	D	none	-	-	>6.0	-	-
815-Bridger	B	none	-	-	>6.0	-	-
-Nielsen Variant	D	none	-	-	>6.0	-	-
816-Nielsen	D	none	-	-	>6.0	-	-
-Millerlake	B	none	-	-	>6.0	-	-
818-Nielsen	D	none	-	-	>6.0	-	-
-Gilispie	D	none	-	-	>6.0	-	-
820-Bachus	C	none	-	-	>6.0	-	-
-Wix	C	none	-	-	>6.0	-	-

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Freq.	Duration	Months	Depth(ft.)	Kind	Months
822-Starley	D	none	-	-	>6.0	-	-
-Bachus	C	none	-	-	>6.0	-	-
-Starman	D	none	-	-	>6.0	-	-
850-Millerlake	B	none	-	-	>6.0	-	-
-Adel	B	none	-	-	>6.0	-	-
854-Burnette	B	none	-	-	>6.0	-	-
-Millerlake	B	none	-	-	>6.0	-	-
870-Wix	C	none	-	-	>6.0	-	-
-Judkins	C	none	-	-	>6.0	-	-
872-Burnette	B	none	-	-	>6.0	-	-
-Nielsen Variant	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						
876-Wetterhorn	C	none	-	-	>6.0	-	-
-Wetterhorn Variant	C	none	-	-	>6.0	-	-
902-Samsil	D	none	-	-	>6.0	-	-
-Shingle	D	none	-	-	>6.0	-	-
-Rock outcrop	Not rated						

Table 7. Soil Features.

Absence of an entry indicates the feature is not a concern.

Soil name and map symbol	Bedrock		Cemented Pan		Subsidence		Potential Frost Action	Risk of Corrosion	
	Depth	Hardness	Depth	Hardness	Init. (in.)	Total (in.)		Steel	Concrete
11-Larimer loam	>60		-		-		Low	High	Low
11L-Larimer sandy loam	>60		-		-		Low	High	Low
11T-Garland	>60		-		-		Low	High	High
-Preatorson	>60		-		-		Low	High	Low
45-Youngston	>60		-		-		Low	High	High
-Glenton	>60		-		-		Low	High	Low
46-Petrie	>60		-		-		Low	High	High
-Kim	>60		-		-		Low	High	Low
47-Petrie	>60		-		-		Low	High	High
-Cadoma	20-40	Rippable	-		-		Low	High	High
-Epsie	<20	Rippable	-		-		Moderate	High	High
60-Cadoma	20-40	Rippable	-		-		Low	High	High
-Kim	>60		-		-		Low	High	Low
67-Cadoma	20-40	Rippable	-		-		Low	High	High
-Arvada	>60		-		-		Low	High	Moderate
-Worfka	10-20	Rippable	-		-		Moderate	High	Low
68-Cadoma	20-40	Rippable	-		-		Low	High	High
-Epsie	<20	Rippable	-		-		Moderate	High	High
69-Kim	>60		-		-		Low	High	Low
70-Cadoma	20-40	Rippable	-		-		Low	High	High
71-Cadoma	20-40	Rippable	-		-		Low	High	High
-Shingle	<20	Rippable	-		-		Low	High	Low
72-Absted	>60		-		-		Low	High	High
-Arvada	>60		-		-		Low	High	Moderate
73-Absted	>60		-		-		Low	High	High
-Stoneham	>60		-		-		Low	High	Low
-Ulm	>60		-		-		Low	High	Low
74-Petrie	>60		-		-		Low	High	High
-Ulm	>60		-		-		Low	High	Low
75-Arvada	>60		-		-		Low	High	Moderate
-Kim alkali	>60		-		-		Low	High	Moderate

Soil name and map symbol	Bedrock Depth	Bedrock Hardness	Cemented Pan Depth	Cemented Pan Hardness	Subsidence Init. (in.)	Subsidence Total (in.)	Potential Frost Action	Risk of Corrosion Steel	Risk of Corrosion Concrete
93-Vona	>60		-		-		Low	High	Low
-Olney	>60		-		-		Low	High	Low
102-Rock outcrop	Not Rated								
109-Epsie	<20	Rippable	-		-		Moderate	High	High
-Rock outcrop	Not Rated								
110-Shingle	<20	Rippable	-		-		Low	High	Low
-Tassel	10-20	Rippable	-		-		Low	High	Low
111-Rock outcrop	Not Rated								
-Shingle	<20	Rippable	-		-		Low	High	Low
-Tassel	10-20	Rippable	-		-		Low	High	Low
112-Oceanet	10-20	Hard	-		-		Low	High	Low
-Persayo	10-20	Rippable	-		-		Low	High	Low
-Rock outcrop	Not Rated								
190-Epsie	<20	Rippable	-		-		Moderate	High	High
-Shingle	<20	Rippable	-		-		Low	High	Low
192-Cadoma	20-40	Rippable	-		-		Low	High	High
-Shingle	<20	Rippable	-		-		Low	High	Low
-Rock outcrop	Not Rated								
243-Kim alkali	>60		-		-		Low	High	Moderate
-Kim	>60		-		-		Low	High	Low
244-Kim alkali	>60		-		-		Low	High	Moderate
245-Orella	10-20	Rippable	-		-		Low	High	Low
246-Orella	10-20	Rippable	-		-		Low	High	Low
-Epsie	<20	Rippable	-		-		Moderate	High	High
-Rock outcrop	Not Rated								
247-Torriorthents	Too variable to rate								
315-Persayo	10-20	Rippable	-		-		Low	High	Low
-Clifterson	>60		-		-		Low	High	Moderate
322-Nihill	>60		-		-		Moderate	High	Low
-Shingle	<20	Rippable	-		-		Low	High	Low
323-Nihill	>60		-		-		Moderate	High	Low
324-Larimer	>60		-		-		Low	High	Low
-Nihill	>60		-		-		Moderate	High	Low
325-Larimer	>60		-		-		Low	High	Low
-Stoneham	>60		-		-		Low	High	Low
-Nihill	>60		-		-		Moderate	High	Low

Soil name and map symbol	Bedrock Depth	Bedrock Hardness	Cemented Pan Depth	Cemented Pan Hardness	Subsidence Init. (in.)	Subsidence Total (in.)	Potential Frost Action	Risk of Corrosion Steel	Risk of Corrosion Concrete
345-Vona	>60		-		-		Low	High	Low
-Otero	>60		-		-		Low	High	Low
346-Nelson	20-40	Rippable	-		-		Low	High	Low
-Terry	20-40	Rippable	-		-		Low	High	Low
-Otero	>60		-		-		Low	High	Low
360-Stoneham	>60		-		-		Low	High	Low
-Kim	>60		-		-		Low	High	Low
371-Pavillion	20-40	Rippable	-		-		Low	High	High
-Persayo	10-20	Rippable	-		-		Low	High	Low
372-Tassel	10-20	Rippable	-		-		Low	High	Low
-Nelson	20-40	Rippable	-		-		Low	High	Low
373-Neville	>60		-		-		Low	High	Low
-Tensleep	>60		-		-		Low	High	High
375-Bowbac	20-40	Rippable	-		-		Moderate	Moderate	Low
-Olney	>60		-		-		Low	High	Low
-Arvada	>60		-		-		Low	High	Moderate
382-Rock outcrop	Not Rated								
-Tassel	10-20	Rippable	-		-		Low	High	Low
383-Rock outcrop	Not Rated								
-Tassel	10-20	Rippable	-		-		Low	High	Low
-Nelson	20-40	Rippable	-		-		Low	High	Low
389-Spearfish	6-20	Rippable	-		-		Low	High	Moderate
-Neville	>60		-		-		Low	High	Low
393-Olney	>60		-		-		Low	High	Low
-Bowbac	20-40	Rippable	-		-		Moderate	Moderate	Low
394-Saddle	20-40	Rippable	-		-		Low	High	Low
-Oceanet	10-20	Hard	-		-		Low	High	Low
398-Tassel	10-20	Rippable	-		-		Low	High	Low
-Bowbac	20-40	Rippable	-		-		Moderate	Moderate	Low
-Terry	20-40	Rippable	-		-		Low	High	Low
410-Bondman	10-20	Hard	-		-		Low	High	Low
-Worfka	10-20	Rippable	-		-		Moderate	High	Low
-Worf	10-20	Rippable	-		-		Low	High	Low

Soil name and map symbol	Bedrock Depth	Bedrock Hardness	Cemented Pan Depth	Cemented Pan Hardness	Subsidence Init. (in.)	Subsidence Total (in.)	Potential Frost Action	Risk of Corrosion Steel	Risk of Corrosion Concrete
411-Bondman	10-20	Hard	-		-		Low	High	Low
-Rock outcrop	Not Rated								
-Worf	10-20	Rippable	-		-		Low	High	Low
426-Larim	>60		-		-		Moderate	High	Low
-Larimer	>60		-		-		Low	High	Low
445-Rekop	10-20	Rippable	-		-		Moderate	High	High
-Gystrum	20-40	Rippable	-		-		Low	High	High
446-Rock outcrop	Not Rated								
-Travessilla	6-20	Hard	-		-		Low	Moderate	Low
-Spearfish	6-20	Rippable	-		-		Low	High	Moderate
447-Travessilla	6-20	Hard	-		-		Low	Moderate	Low
448-Torrifluvents	Too variable to rate								
449-Travessilla	6-20	Hard	-		-		Low	Moderate	Low
-Rock outcrop	Not Rated								
450-Torrifluvents	Too variable to rate								
-Fluvaquents	Too variable to rate								
490-Shingle	<20	Rippable	-		-		Low	High	Low
-Thedalund	20-40	Rippable	-		-		Low	High	Low
546-Spearfish	6-20	Rippable	-		-		Low	High	Moderate
-Rock outcrop	Not Rated								
-Neville	>60		-		-		Low	High	Low
572-Worland	20-40	Rippable	-		-		Low	High	Moderate
-Oceanet	10-20	Hard	-		-		Low	High	Low
590-Shingle	<20	Rippable	-		-		Low	High	Low
-Rock outcrop	Not Rated								
601-Youngston	>60		-		-		Low	High	Moderate
-Uffens	>60		-		-		Low	High	High
-Glenton	>60		-		-		Moderate	High	High
602-Binton	>60		-		-		Low	High	High
-Uffens	>60		-		-		Low	High	High
604-Effington	>60		-		-		Low	High	High
-Effington variant	30	Hard	-		-		Low	High	High
606-Hoot	10-20	Hard	-		-		Low	Moderate	Low
-Rock outcrop	Not Rated								

Soil name and map symbol	Bedrock Depth	Bedrock Hardness	Cemented Pan Depth	Cemented Pan Hardness	Subsidence Init. (in.)	Subsidence Total (in.)	Potential Frost Action	Risk of Corrosion Steel	Risk of Corrosion Concrete
645-Mudray	10-20	Rippable	-		-		Low	High	High
-Persayo	10-20	Rippable	-		-		Low	High	Low
-Effington Variant	20-40	Hard	-		-		Low	High	High
650-Mudray	10-20	Rippable	-		-		Low	High	High
671-Rock outcrop	Not Rated								
-Persayo	10-20	Rippable	-		-		Low	High	Low
675-Pavillion	20-40	Rippable	-		-		Low	High	High
-Youngston	>60		-		-		Low	High	Moderate
700-Stoneham	>60		-		-		Low	High	Low
-Cushman	20-40	Rippable	-		-		Low	High	Low
701-Fort Collins	>60		-		-		Low	High	Low
-Kim	>60		-		-		Low	High	Low
702-Absted	>60		-		-		Low	High	High
-Fort Collins	>60		-		-		Low	High	Low
703-Fort Collins	>60		-		-		Low	High	Low
-Cushman	20-40	Rippable	-		-		Low	High	Low
705-Kim	>60		-		-		Low	High	Low
-Thedalund	20-40	Rippable	-		-		Low	High	Low
706-Cushman	20-40	Rippable	-		-		Low	High	Low
-Terry	20-40	Rippable	-		-		Low	High	Low
-Worf	10-20	Rippable	-		-		Low	High	Low
708-Renohill	20-40	Rippable	-		-		Low	High	Low
-Cushman	20-40	Rippable	-		-		Low	High	Low
-Wörfka	10-20	Rippable	-		-		Moderate	High	Low
710-Cadoma	20-40	Rippable	-		-		Low	High	High
-Renohill	20-40	Rippable	-		-		Low	High	Low
-Ulm	>60		-		-		Low	High	Low
720-Blazon	10-20	Rippable	-		-		Low	High	Low
-Rock outcrop	Not Rated								
722-Blazon	10-20	Rippable	-		-		Low	High	Low
723-Blazon	10-20	Rippable	-		-		Low	High	Low
-Delphill	20-40	Rippable	-		-		Moderate	High	Low
724-Blazon	10-20	Rippable	-		-		Low	High	Low
-Brownsto	>60		-		-		Low	High	Low

Soil name and map symbol	Bedrock Depth	Bedrock Hardness	Cemented Pan Depth	Cemented Pan Hardness	Subsidence Init. (in.)	Subsidence Total (in.)	Potential Frost Action	Risk of Corrosion Steel	Risk of Corrosion Concrete
725-Blazon	10-20	Rippable	-		-		Low	High	Low
-Diamondville	20-40	Rippable	-		-		Low	High	Low
730-Forelle	>60		-		-		Moderate	High	Low
-Diamondville	20-40	Rippable	-		-		Low	High	Low
732-Thermopolis	10-20	Rippable	-		-		Low	High	High
-Rock outcrop	Not Rated								
735-Patent	>60		-		-		Low	Moderate	Low
-Forelle	>60		-		-		Moderate	High	Low
736-Forelle	>60		-		-		Moderate	High	Low
-Pinelli	>60		-		-		Low	High	Moderate
737-Forelle	>60		-		-		Moderate	High	Low
-Alcova	>60		-		-		Low	High	Low
749-Renohill	20-40	Rippable	-		-		Low	High	Low
-Worfka	10-20	Rippable	-		-		Moderate	High	Low
750-Worfka	10-20	Rippable	-		-		Moderate	High	Low
-Cushman	20-40	Rippable	-		-		Low	High	Low
751-Worfka	10-20	Rippable	-		-		Moderate	High	Low
-Shingle	<20	Rippable	-		-		Low	High	Low
-Rock outcrop	Not Rated								
752-Epsie	<20	Rippable	-		-		Moderate	High	High
753-Gaynor	20-40	Rippable	-		-		Low	High	High
-Samsil	4-20	Rippable	-		-		Low	High	Moderate
802-Rock outcrop	Not Rated		-						
-Starman	3-10	Hard	-		-		Moderate	High	Low
804-Rock outcrop	Not Rated								
-Merino	20	Hard	-		-		Moderate	High	Low
806-Starley	10-20	Hard	-		-		Low	High	Low
-Starman	3-10	Hard	-		-		Moderate	High	Low
-Rock outcrop	Not Rated								
808-Nielsen	10-20	Hard	-		-		Moderate	Moderate	Low
-Nielsen Variant	15-20	Hard	-		-		Moderate	High	Moderate
-Rock outcrop	Not Rated								
810-Gilispie	10-20	Hard	-		-		Moderate	Moderate	Low
-Bachus	20-40	Hard	-		-		Moderate	High	Low
-Nielsen	10-20	Hard	-		-		Moderate	Moderate	Low

Soil name and map symbol	Bedrock Depth	Bedrock Hardness	Cemented Pan Depth	Cemented Pan Hardness	Subsidence Init. (in.)	Subsidence Total (in.)	Potential Frost Action	Risk of Corrosion Steel	Risk of Corrosion Concrete
812-Bachus	20-40	Hard	-		-		Moderate	High	Low
-Mayoworth	20-40	Rippable	-		-		Moderate	High	Low
813-Cryoboroels	Too variable to rate								
-Cryorthents	Too variable to rate								
814-Mayoworth	20-40	Rippable	-		-		Moderate	High	Low
-Burnette	>60		-		-		Moderate	High	Low
-Nielsen Variant	15-20	Hard	-		-		Moderate	High	Moderate
815-Bridger	>60		-		-		Moderate	High	Low
-Nielsen Variant	15-20	Hard	-		-		Moderate	High	Moderate
816-Nielsen	10-20	Hard	-		-		Moderate	Moderate	Low
-Millerlake	>60		-		-		Moderate	High	Low
818-Nielsen	10-20	Hard	-		-		Moderate	Moderate	Low
-Gilispie	10-20	Hard	-		-		Moderate	Moderate	Low
820-Bachus	20-40	Hard	-		-		Moderate	High	Low
-Wix	20-40	Rippable	-		-		Moderate	High	Moderate
822-Starley	10-20	Hard	-		-		Low	High	Low
-Bachus	20-40	Hard	-		-		Moderate	High	Low
-Starman	3-10	Hard	-		-		Moderate	High	Low
850-Millerlake	>60		-		-		Moderate	High	Low
-Adel	>60		-		-		Moderate	High	Low
854-Burnette	>60		-		-		Moderate	High	Low
-Millerlake	>60		-		-		Moderate	High	Low
870-Wix	20-40	Rippable	-		-		Moderate	High	Moderate
-Judkins	20-40	Hard	-		-		Moderate	Moderate	Moderate
872-Burnette	>60		-		-		Moderate	High	Low
-Nielsen Variant	15-20	Hard	-		-		Moderate	High	Moderate
-Rock Outcrop	Not Rated								
876-Wetterhorn	20-40	Hard	-		-		High	Moderate	Moderate
-Wetterhorn Variant	20-40	Hard	-		-		Moderate	Moderate	Moderate
902-Samsil	4-20	Rippable	-		-		Low	High	Moderate
-Shingle	<20	Rippable	-		-		Low	High	Low
-Rock Outcrop	Not Rated								

GENESIS AND CLASSIFICATION OF SOILS

The classification of the soils according to Soil Taxonomy (Soil Survey Staff, 1975) is presented in Table 8. Relationships of the soils to one another and to genetic factors are outlined in Table 9. This table organizes information about moisture and temperature regime, particle-size class, depth to bedrock, sodium saturation, and other soil features. Special terms are taken from Soil Taxonomy.

Table 8. Classification of the soils.

Soil Name	Family or Higher Taxonomic Class
Absted	Fine, montmorillonitic, mesic Haplustollic Natrargids
Adel	Fine-loamy, mixed Pachic Cryoborolls
Alcova (T)	Fine-loamy, mixed Borollic Haplargids
Arvada	Fine, montmorillonitic, mesic Ustollic Natrargids
Bachus	Fine-loamy, mixed Argic Pachic Cryoborolls
Binton	Fine-loamy, mixed (calcareous), mesic Typic Torrifluvents
Blazon	Loamy, mixed (calcareous), frigid, shallow Ustic Torriorthents
Bondman	Loamy, mixed, mesic Lithic Ustollic Haplargids
Bowbac	Fine-loamy, mixed, mesic Ustollic Haplargids
Bridger	Fine, mixed Argic Cryoborolls
Brownsto (T)	Loamy-skeletal, mixed, Borollic Calciorthids
Burnette	Fine, montmorillonitic Argic Pachic Cryoborolls
Cadoma	Fine, montmorillonitic, mesic Ustollic Camborthids
Clifterson	Loamy-skeletal, mixed (calcareous), mesic Typic Torriorthents
Cryoborolls	Cryoborolls
Cryorthents	Cryorthents
Cushman	Fine-loamy, mixed, mesic Ustollic Haplargids
Delphill	Fine-loamy, mixed (calcareous), frigid Ustic Torriorthents
Diamondville*	Fine-loamy, mixed Borollic Haplargids
Effington	Fine, montmorillonitic, mesic Typic Natrargids
Effington Variant	Fine, montmorillonitic, mesic Typic Natrargids
Epsie	Clayey, montmorillonitic (calcareous), mesic, shallow Ustic Torriorthents
Fluvaquents	Fluvaquents
Forelle	Fine-loamy, mixed Borollic Haplargids
Fort Collins	Fine-loamy, mixed, mesic Ustollic Haplargids
Garland	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Haplargids
Gaynor	Fine, montmorillonitic (calcareous), mesic Ustic Torriorthents
Gilispie	Loamy, mixed Argic Lithic Cryoborolls
Glenton	Coarse-loamy, mixed (calcareous), mesic Typic Torrifluvents
Gystrum	Fine-silty, gypsic, mesic Ustollic Camborthids
Hoot	Loamy-skeletal, mixed, mesic Lithic Haplargids
Judkins*	Loamy-skeletal, mixed Mollic Cryoboralfs
Kim	Fine-loamy, mixed (calcareous), mesic Ustic Torriorthents
Larim	Loamy-skeletal, mixed, mesic Ustollic Haplargids
Larimer	Fine-loamy over sandy or sandy skeletal, mixed, mesic Ustollic Haplargids

Table 8. Classification of the soils. (cont.)

Soil Name	Family or Higher Taxonomic Class
Mayoworth	Fine, montmorillonitic Argic Cryoborolls
Merino	Loamy-skeletal, mixed, nonacid Lithic Cryorthents
Millerlake	Fine-loamy, mixed Argic Pachic Cryoborolls
Mudray	Clayey, montmorillonitic, mesic, shallow Typic Natrargids
Nelson	Coarse-loamy, mixed (calcareous), mesic Ustic Torriorthents
Neville	Fine-loamy, mixed (calcareous), mesic Ustic Torriorthents
Nielsen	Loamy-skeletal, mixed Argic Lithic Cryoborolls
Nielsen Variant	Clayey, montmorillonitic, Lithic Cryoborolls
Nihill	Loamy-skeletal, mixed (calcareous), mesic Ustic Torriorthents
Oceanet	Loamy, mixed (calcareous), mesic, shallow Typic Torriorthents
Olney	Fine-loamy, mixed, mesic Ustollic Haplargids
Orella	Clayey, mixed (calcareous), mesic, shallow Ustic Torriorthents
Otero	Coarse-loamy, mixed (calcareous), mesic Ustic Torriorthents
Patent	Fine-loamy, mixed (calcareous), frigid Ustic Torriorthents
Pavillion	Fine-loamy, mixed, mesic Typic Camborthids
Persayo	Loamy, mixed (calcareous), mesic, shallow Typic Torriorthents
Petrie	Fine, montmorillonitic (calcareous), mesic Ustertic Torriorthents
Pinelli	Fine, montmorillonitic Borollic Haplargids
Preatorson	Loamy-skeletal, mixed, mesic Typic Haplargids
Rekop	Loamy, gypsic, mesic, shallow Ustic Torriorthents
Renohill	Fine, montmorillonitic, mesic Ustollic Haplargids
Saddle	Fine-loamy, mixed, mesic Typic Haplargids
Samsil	Clayey, montmorillonitic (calcareous), mesic, shallow Ustic Torriorthents
Shingle	Loamy, mixed (calcareous), mesic, shallow Ustic Torriorthents
Spearfish	Loamy, mixed (calcareous), mesic, shallow Ustic Torriorthents
Starley	Loamy-skeletal, mixed Lithic Cryoborolls
Starman	Loamy-skeletal, mixed (calcareous) Lithic Cryorthents
Stoneham	Fine-loamy, mixed, mesic Ustollic Haplargids
Tassel	Loamy, mixed (calcareous), mesic, shallow Ustic Torriorthents
Tensleep	Fine-silty, mixed, mesic Ustollic Haplargids
Terry	Coarse-loamy, mixed (calcareous), mesic Ustollic Haplargids

Table 8. Classification of the soils. (cont.)

Soil Name	Family or Higher Taxonomic Class
Thedalund	Fine-loamy, mixed (calcareous), mesic Ustic Torriorthents
Thermopolis	Loamy, mixed (calcareous), frigid, shallow Ustic Torriorthents
Torrifluvents	Torrifluvents
Torriorthents	Torriorthents
Travessilla	Loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents
Uffens	Fine-loamy, mixed, mesic Typic Natrargids
Ulm	Fine, montmorillonitic, mesic Ustollic Haplargids
Vona	Coarse-loamy, mixed, mesic Ustollic Haplargids
Wetterhorn	Fine, montmorillonitic Typic Cryoboralfs
Wetterhorn Variant	Clayey-skeletal, montmorillonitic Typic Cryoboralfs
Wix (T)	Fine-loamy, mixed Mollic Cryoboralfs
Worf	Loamy, mixed, mesic, shallow Ustollic Haplargids
Worfka (T)	Clayey, montmorillonitic, mesic, shallow Ustollic Haplargids
Worland	Coarse-loamy, mixed (calcareous), mesic Typic Torriorthents
Youngston	Fine-loamy, mixed (calcareous), mesic Typic Torrifluvents

(T) -- Tentative series. Other series are established.
* -- Taxadjunct.

Table 9. Genetic Relationships of Soils

Particle size classes and other features	Soil Series Depth to Bedrock, inches <20	 20-40	 >40
I. Soils with Aridic Moisture Regime, Typic Range, and Mesic Temperature Regime			
Ochric Epipedon			
Coarse-loamy-	Oceanet	Worland	
Fluventic			Glenton
Loamy-skeletal			Clifterson
Fine-loamy-	Persayo		
Fluventic			Youngston
Fluventic, sodic			Binton
Cambic Horizon			
Fine-loamy-		Pavillion	
Argillic Horizon			
Fine-loamy-		Saddle	
-over skeletal			Garland
Loamy-skeletal-			Preatorson
-lithic	Hoot		
Natric Horizon			
Fine-loamy			Uffens
Fine	Mudray	Effington Variant	

Particle size classes and other features	Soil Series Depth to Bedrock, inches <20	 20-40	 >40
II. Soils with Aridic Moisture Regime Marginal to Ustic and Mesic Temperature Regime			
Ochric Epipedon			
Coarse-loamy-	Tassel	Nelson	Otero
-lithic	Travessilla		
-Loamy-skeletal			Nihill
Fine-loamy-	Shingle	Thedalund	Kim
-red	Spearfish		Neville
-gypsic	Rekop		
Fine-	Samsil	Gaynor	
-sodic	Orella		Petrie
-sodic, gypsiferous	Epsie		
Cambic Horizon			
Fine-silty		Gystrum	
Fine-sodic		Cadoma	
Argillic Horizon			
Coarse-loamy		Terry	Vona
Fine-loamy->35% sand*		Bowbac	Olney
-<35% sand*	Worf	Cushman	Fort Collins Stoneham
-lithic	Bondman		
-over skeletal			Larimer
Loamy-skeletal			Larim
Fine-silty-red			Tensleep
Fine	Worfka	Renohill	Ulm
Natric Horizon			
Fine			Absted Arvada

*Coarser than very fine sand

Particle size classes and other features	Soil Series Depth to Bedrock, inches <20	20-40	>40
III. Soils with Aridic Moisture Regime Marginal to Ustic and Frigid Temperature Regime			
Ochric Epipedon			
Fine-loamy-	Blazon	Delphill	Patent
-red	Thermopolis		
Calcic Horizon			
Coarse-loamy-			
Loamy-skeletal			Brownsto
Argillic Horizon			
Fine-loamy-		Diamondville	Forelle
-over skeletal			Alcova
Fine			Pinelli

Particle size classes and other features	Soil Series Depth to Bedrock, inches <20	20-40	>40
IV. Soils with Cryic Temperature Regime			
Ochric Epipedon			
Loamy-skeletal-lithic			
-noncalcareous	Merino		
-calcareous	Starman		
Mollic Epipedon			
Loamy-skeletal-lithic	Starley		
Fine-loamy-pachic			Adel
Fine-lithic	Nielsen Variant		
Mollic Epipedon and Argillic Horizon			
Fine-loamy-			
-lithic	Gilispie		
-pachic		Bachus	Millerlake
Loamy-skeletal-lithic	Nielsen		
Fine-		Mayoworth	Bridger
-pachic			Burnette
Argillic Horizon			
Fine-loamy-		Wix	
Loamy-skeletal		Judkins	
Fine-		Wetterhorn	
-clayey-skeletal		Wetterhorn Variant	

TAXONOMIC UNIT DESCRIPTIONS

The soil series that are represented as components of the soil map units are described in this section. The descriptions are arranged alphabetically by series name. Further information about these series is presented in the section on Genesis and Classification of Soils.

Absted Series

The Absted series consists of very deep, well drained, slowly permeable soils. They occur on alluvial fans and valley filling sideslopes. They have formed in alluvium. Slopes are 0 to 10 percent.

Typical pedon of Absted loam, 0 to 10 percent slopes, center, sec. 5, T. 45N., R. 98W., in an area of mapping unit 73.

A1--0 to 3 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; strong thin platy structure; soft, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; clear smooth boundary.

B21t--3 to 9 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure breaking to strong medium subangular blocky structure; very hard, firm, slightly sticky, slightly plastic; no effervescence; strongly alkaline; clear wavy boundary.

B22t--9 to 12 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; strong medium subangular blocky structure; very hard, firm, sticky, plastic; slight effervescence; strongly alkaline; gradual wavy boundary.

B23tcs--12 to 20 inches; light brownish gray (10YR 6/2) clay loam, brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky, plastic; prominent gypsum seams; slight effervescence; strongly alkaline; clear wavy boundary.

C1cs--20 to 25 inches; pale brown (10YR 6/3) clay loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few gypsum seams; slight effervescence; moderately alkaline; gradual wavy boundary.

C2--25 to 32 inches; light brownish gray (10YR 6/2) clay loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline; gradual wavy boundary.

C3--32 to 60 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR through 5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is loam or fine sandy loam.

Absted Series--Continued

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam, silty clay loam, or clay.

The C horizon has a color hue of 10YR or 2.5Y. Texture is clay loam.

Adel Series

The Adel series consists of very deep, well drained, moderately permeable soils. They occur in swales and concave valley floor positions and on sideslopes and footslopes. They have formed in alluvium. Slopes are 3 to 30 percent.

Typical pedon of Adel loam, 0 to 6 percent slopes, NE¼, NE¼, sec. 22, T. 45N., R. 101W., in an area of mapping unit 850.

A11--0 to 6 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; moderate fine granular structure and weak fine angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; no effervescence; neutral; abrupt smooth boundary.

A12--6 yo 42 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; moderate medium prismatic structure parting to moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; no effervescence; neutral; gradual wavy boundary.

C--42 to 60 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium angular blocky structure; very hard, extremely firm, very sticky, very plastic; no effervescence; mildly alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR, value of 3 or 4 (2 or 3 moist), and chroma of 1 or 2 dry or moist. Texture is loam or silt loam.

The C horizon has a color hue of 10YR, value of 5 or 6 (3 or 4 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam.

Alcova Series

The Alcova series consists of very deep, well drained, moderately permeable soils. They are located on terraces. They have formed in alluvium. Slopes are 3 to 15 percent.

Typical pedon of Alcova loam, 3 to 15 percent slopes, center of S½, sec. 28, T. 44N., R. 100W., in an area of mapping unit 737.

A1--0 to 3 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, slightly plastic; many fine and medium roots; no effervescence; neutral; clear wavy boundary.

B1--3 to 8 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky, very plastic; no effervescence; mildly alkaline; clear wavy boundary.

B21t--8 to 18 inches; brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine prismatic structure parting to moderate fine angular blocky structure; hard, firm, very sticky, very plastic; no effervescence; mildly alkaline; clear wavy boundary.

B22t--18 to 25 inches; grayish brown (10YR 5/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, sticky, plastic; no effervescence; mildly alkaline; abrupt wavy boundary.

IIC--25 to 60 inches; very gravelly sandy loam; massive; soft, friable, nonsticky, nonplastic; strong effervescence; moderately alkaline.

Depth to very gravelly substratum ranges from 20 to 40 inches. Content of coarse fragments ranges from 5 to 35 percent above the very gravelly substratum.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam or fine sandy loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 4 through 6 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is clay loam or sandy clay loam.

The C horizon has a color hue of 10YR or 2.5Y. Texture is very gravelly sandy loam or very gravelly loam.

Arvada Series

The Arvada series consists of deep, well drained soils with very slow permeability. They are located on stream terraces and alluvial fans. They have formed in alluvium derived dominantly from sedimentary rock. Slopes are 0 to 10 percent.

Typical pedon of Arvada fine sandy loam, 0 to 10 percent slopes, NW¼, NW¼, sec. 35, T. 46N., R. 98W., in an area of mapping unit 75.

A2--0 to 3 inches; light gray (10YR 7/2) fine sandy loam, grayish brown (10YR 5/2) moist; moderate medium and coarse platy structure; slightly hard, friable, nonsticky, nonplastic; many vesicular pores; few roots; slight effervescence; strongly alkaline; clear smooth boundary.

B21t--3 to 7 inches; pale brown (10YR 6/3) sandy clay, mixed dark grayish brown and brown (10YR 4/2 and 10YR 5/3) moist; weak coarse prismatic structure parting to strong medium angular blocky structure; extremely hard, firm, very sticky, plastic; continuous clay films; strong effervescence; very strongly alkaline; gradual irregular boundary.

B22t--7 to 13 inches; light brownish gray (10YR 6/2) sandy clay, mixed dark grayish brown and brown (10YR 4/2 and 10YR 5/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky, slightly plastic; few clay films; strong effervescence; very strongly alkaline; gradual irregular boundary.

C1--13 to 22 inches; light gray (2.5Y 7/2) sandy loam, light brownish gray (2.5Y 6/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; slight effervescence; very strongly alkaline; gradual wavy boundary.

C2--22 to 28 inches; mixed pale brown and light gray (10YR 6/3 and 10YR 7/2) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; strong effervescence; very strongly alkaline; gradual wavy boundary.

C3--28 to 34 inches; pale brown (10YR 6/3) sandy clay loam, mixed dark grayish brown and brown (10YR 4/2 and 10YR 5/3) moist; massive; slightly hard, friable, sticky, slightly plastic; strong effervescence; very strongly alkaline; gradual wavy boundary.

IIC4--34 to 44 inches; pale brown (10YR 6/3) silty clay, mixed light brownish gray and brown (10YR 6/2 and 10YR 5/3) moist; massive; very hard, firm, very sticky, very plastic; slight effervescence; strongly alkaline; gradual wavy boundary.

Arvada Series--Continued

IIC5--44 to 60 inches; mixed light gray and white (10YR 7/2 and 10YR 8/2) silty clay, pale brown (10YR 6/3) moist; massive; very hard, friable, very sticky, very plastic; few gypsum seams; slight effervescence; mildly alkaline.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 1 through 3 dry or moist. The texture is loam or fine sandy loam. Reaction is moderately to very strongly alkaline.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. The texture is clay, clay loam, or sandy clay. Reaction is strongly or very strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Content of coarse fragments is less than 10 percent. Reaction is mildly to very strongly alkaline.

Bachus Series

The Bachus series consists of moderately deep, well drained, moderately permeable soils. They are located on mountain sideslopes, toe slopes, and valley bottoms. They have formed in alluvium and residuum derived from sedimentary rock. Slopes are 3 to 20 percent.

Typical pedon of Bachus loam, 3 to 20 percent slopes, center sec. 22, T. 45N., R. 101W., in an area of mapping unit 810.

A1--0 to 4 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, nonsticky, slightly plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

B2t--4 to 14 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure; hard, friable, sticky, plastic; many roots; no effervescence; neutral; clear smooth boundary.

B3--14 to 20 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable, sticky, plastic; many roots; no effervescence; neutral; clear smooth boundary.

C--20 to 30 inches; grayish brown (10YR 5/2) clay loam, (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable, sticky, plastic; no effervescence; neutral; abrupt wavy boundary.

R--30 inches; sandstone bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent. The mollic epipedon is 16 to 24 inches thick.

The A horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 or 2 dry or moist. The texture is loam or clay loam.

The B horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 or 2 dry or moist. The texture is clay loam or gravelly clay loam.

The C horizon has a color hue of 10YR.

Binton Series

The Binton series consists of very deep, well drained, slowly permeable soils. They occur on floodplains, terraces, and alluvial fans. They have formed in mixed alluvium. Slopes are 0 to 6 percent.

Typical pedon of Binton loam, 0 to 6 percent slopes, SE¼, SE¼, sec. 25, T. 49N., R. 97W., in an area of mapping unit 602.

A1--0 to 3 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak medium and thin platy structure; soft, firable, nonsticky, nonplastic; slight effervescence; strongly alkaline; gradual wavy boundary.

C1--3 to 8 inches; light brownish gray (2.5Y 6/2) thinly stratified fine sandy loam and silt loam, grayish brown (2.5Y 5/2) moist; weak coarse angular blocky structure; slightly hard, friable, nonsticky, nonplastic; slight effervescence; strongly alkaline; gradual wavy boundary.

C2--8 to 15 inches; light gray (2.5Y 7/2) thinly stratified sandy loam, clay loam, and silt loam, grayish brown (2.5Y 5/2) moist; weak coarse angular blocky structure; very hard, firm, slightly sticky, slightly plastic; slight effervescence; very strongly alkaline; gradual wavy boundary.

C3--15 to 24 inches; light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky, slightly plastic; slight effervescence; many roots; very strongly alkaline; gradual wavy boundary.

C4--24 to 48 inches; pale brown (10YR 6/3) stratified fine sandy loam, loam, and clay loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; slight effervescence; very strongly alkaline; gradual wavy boundary.

C5--48 to 60 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; soft, friable, nonsticky, nonplastic; slight effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. The texture is loam, fine sandy loam, or silt loam.

The C horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 or 3 dry or moist. The texture is stratified sandy loam, silt loam, clay loam, or silty clay loam.

Blazon Series

The Blazon series consists of shallow, well drained, moderately permeable soils. They are located on dissected residual uplands. They have fromed in residuum from shale, siltstone, and shale. Slopes are 3 to 45 percent.

Typical pedon of Blazon loam, 3 to 30 percent slopes, SW¼, NE¼, 2000 feet south and 400 feet east of N¼, sec. 28, T. 46N., R. 99W., in an area of mapping unit 723.

A1--0 to 3 inches; brown (10YR 5/3) loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many roots; no effervescence; mildly alkaline; gradual wavy boundary.

AC--3 to 12 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many roots; no effervescence; mildly alkaline; gradual wavy boundary.

Cca--12 to 16 inches; very pale brown (10YR 7/4) loam, yellowish brown (10YR 5/4) moist; massive; soft, friable, slightly sticky, slightly plastic; common roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

Cr--16 inches; soft siltstone and sandstone.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 4 through 6 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam or clay loam.

The AC and C horizons have a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam or clay loam.

Bondman Series

The Bondman series consists of shallow, well drained, moderately permeable soils. They are located on residual uplands. They have formed in residuum from sandstone; interbedded with shale and siltstone in some areas. Slopes are 0 to 15 percent.

Typical pedon of Bondman fine sandy loam, 0 to 15 percent slopes, NE¼, NW¼, NE¼, sec. 12, T. 47N., R. 98W., in an area of mapping unit 410.

A1--0 to 3 inches; light brownish gray (10YR 6/2) fine sandy loam, brown (10YR 4/3) moist; weak thin platy and moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many roots; no effervescence; mildly alkaline; clear wavy boundary.

B2t--3 to 11 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many roots; no effervescence; mildly alkaline; gradual irregular boundary.

Cr--11 to 15 inches; yellowish brown (10YR 5/4 and 10YR 5/6) very channery sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky, slightly plastic; few roots; no effervescence; mildly alkaline; gradual irregular boundary.

R--15 inches; noncalcareous sandstone bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 15 percent in the A and B horizons.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3 dry or moist. The texture is fine sandy loam or sandy loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 through 4 dry or moist. The texture is sandy clay loam or clay loam.

Bowbac Series

The Bowbac series consists of moderately deep, well drained, moderately permeable soils. They are located on alluvial fans, footslopes, and residual uplands. They have formed in alluvium and residuum from interbedded sandstone and shale. Slopes are 0 to 30 percent.

Typical pedon of Bowbac fine sandy loam, 0 to 30 percent slopes, NW¼, sec. 3, T. 45N., R. 97W., in an area of mapping unit 393.

A1--0 to 3 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (10YR 5/2) moist; weak thin platy structure; soft, friable, nonsticky, nonplastic; no effervescence; neutral; clear wavy boundary.

B2t--3 to 14 inches; pale brown (10YR 6/3) sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium prismatic structure parting to weak fine subangular blocky structure; slightly hard, friable, sticky, plastic; no effervescence; neutral; gradual wavy boundary.

B3ca--14 to 23 inches; pale brown (10YR 6/3) clay loam, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure; slightly hard, friable, sticky, plastic; strong effervescence; moderately alkaline; clear wavy boundary.

C1ca--23 to 30 inches; light gray (2.5Y 7/2) clay loam, brown (10YR 5/3) moist; weak coarse angular blocky structure; slightly hard, friable, sticky, plastic; strong effervescence; few segregated soft lime masses; moderately alkaline; abrupt smooth boundary.

C2r--30 inches; calcareous interbedded shale and sandstone.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. The texture is sandy loam or fine sandy loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. The texture is sandy clay loam, clay loam, or loam.

Bridger Series

The Bridger series consists of very deep, well drained soils with moderately slow permeability. They are located on mountain slopes, alluvial fans, and valleys. They have formed in alluvium or glacial till. Slopes are 3 to 30 percent.

Typical pedon of Bridger cobbly clay loam, 3 to 30 percent slopes, SW¼, SW¼, sec. 22, T. 43N., R. 102W., in an area of mapping unit 815.

A11--0 to 2 inches; dark grayish brown (10YR 4/2) cobbly clay loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, firm, sticky, plastic; many roots; not effervescence; mildly alkaline; abrupt smooth boundary.

A12--2 to 8 inches; dark grayish brown (10YR 4/2) cobbly clay loam, very dark brown (10YR 2/2) moist; moderate coarse subangular blocky structure; hard, firm, sticky; plastic; many roots; no effervescence; neutral; clear wavy boundary.

B2t--8 to 19 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; strong fine prismatic structure parting to strong fine angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; common roots; no effervescence; neutral; abrupt wavy boundary.

C1ca--19 to 31 inches; white (10YR 8/1) gravelly clay, brown (10YR 5/3) moist; massive; hard, firm, sticky, plastic; violent effervescence; moderately alkaline.

C2ca--31 to 60 inches; very gravelly clay loam, massive; violent effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 35 percent between a depth of 10 and 40 inches.

The A horizon has a color hue of 10YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 2 or 3 dry or moist. The texture is loam or clay loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3 dry or moist. The texture is clay, clay loam, gravelly clay, or gravelly clay loam.

Brownsto Series

The Brownsto series consists of very deep, well drained soils with moderately rapid permeability. They are located on mountain slopes. They have formed in gravelly alluvium and colluvium. Slopes are 3 to 30 percent.

Typical pedon of Brownsto gravelly loam, 3 to 30 percent slopes, near E¼ corner, sec. 3, T. 45N., R. 99W., in an area of mapping unit 724.

A--0 to 4 inches; pale brown (10YR 6/3) gravelly loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure and moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; many roots; 20 percent gravel; slight effervescence; moderately alkaline; gradual wavy boundary.

AC--4 to 9 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many roots; 25 percent gravel; slight effervescence; moderately alkaline; clear wavy boundary.

C1ca--9 to 15 inches; white (10YR 8/2) very gravelly loam, pale brown (10YR 6/3) moist; massive; soft, friable, slightly sticky, slightly plastic; common roots; 40 percent gravel with lime coatings on lower surfaces; strong effervescence; moderately alkaline; gradual wavy boundary.

C2ca--15 to 60 inches; white (10YR 8/2) very gravelly loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few roots; 50 percent gravel and cobbles with lime coatings; strong effervescence; strongly alkaline.

Content of coarse fragments ranges from 35 to 60 percent in control section.

The A horizon has a color hue of 10YR, value of 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is very gravelly loam or very gravelly sandy loam.

The C horizon has a color hue of 10YR or 2.5Y, value of 7 or 8 (5 or 6 moist), and chroma of 2 or 3 dry or moist. Texture is very gravelly loam or very gravelly sandy loam.

Burnette Series

The Burnette series consists of very deep, well drained soils with moderately slow permeability. They are located on foot slopes and alluvial fans. Slopes are 0 to 15 percent.

Typical pedon of Burnette loam, 0 to 15 percent slopes, SE¼, SW¼, sec. 8, T. 43N., R. 101W., in an area of mapping unit 854.

A11--0 to 2 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, friable, slightly sticky, slightly plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

A12--2 to 7 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; moderate fine subangular blocky structure; hard, firm, sticky, very plastic; many roots; no effervescence; mildly alkaline; abrupt smooth boundary.

B21t--7 to 20 inches; very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; strong fine and medium prismatic structure; hard, firm, sticky, very plastic; few roots; no effervescence; mildly alkaline; clear wavy boundary.

B22tca--20 to 32 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; strong fine and medium angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; few roots; strong effervescence; moderately alkaline; clear wavy boundary.

Cca--32 to 60 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; massive; hard, firm, very sticky, very plastic; few coarse roots; violent effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent. The mollic epipedon is greater than 16 inches thick.

The A horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is loam or clay loam. Reaction is neutral to moderately alkaline.

The B horizon has a color hue of 10YR, value of 3 through 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is clay loam or clay. Reaction is mildly or moderately alkaline.

The C horizon has a color hue of 10YR. Texture is clay or clay loam.

Cadoma Series

The Cadoma series consists of moderately deep, well drained, slowly permeable soils. They are located in basins. They have formed in alluvium. Slopes are 0 to 15 percent.

Typical pedon of Cadoma silty clay loam, 0 to 15 percent slopes, SW¼, SE¼, sec. 10, T. 44N., R. 96W., in an area of mapping unit 70.

A1--0 to 2 inches; pale brown (10YR 6/3) silty clay loam, olive brown (2.5Y 4/4) moist; moderate thin platy structure parting to moderate very fine granular structure; soft, friable, sticky, plastic; few roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

B1--3 to 4 inches; pale brown (10YR 6/3) silty clay loam, yellowish brown (10YR 5/4) moist; moderate coarse angular blocky structure; hard, firm, very sticky, very plastic; few roots; slight effervescence; very strongly alkaline; abrupt smooth boundary.

B2--4 to 13 inches; light brownish gray (2.5Y 6/2) silty clay, brown (10YR 5/3) moist; moderate coarse prismatic structure parting to moderate medium angular blocky structure; very hard, firm, very sticky, very plastic; few roots; slight effervescence; very strongly alkaline; clear wavy boundary.

B3--13 to 18 inches; light brownish gray (2.5Y 6/2) silty clay, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; hard, firm, very sticky, very plastic; slight effervescence; very strongly alkaline; clear wavy boundary.

C1cs--18 to 37 inches; light gray (2.5Y 7/2) silty clay loam, brown (10YR 5/3) moist; massive; hard, friable, sticky, plastic; few roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

C2r--37 inches; shale bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is silty clay loam, clay or silty clay.

The B and C horizons have a color hue of 10YR or 2.5Y, value of 6 or 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is silty clay loam, silty clay, or clay.

Burnette Series

The Burnette series consists of very deep, well drained soils with moderately slow permeability. They are located on foot slopes and alluvial fans. Slopes are 0 to 15 percent.

Typical pedon of Burnette loam, 0 to 15 percent slopes, SE¼, SW¼, sec. 8, T. 43N., R. 101W., in an area of mapping unit 854.

A11--0 to 2 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, friable, slightly sticky, slightly plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

A12--2 to 7 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; moderate fine subangular blocky structure; hard, firm, sticky, very plastic; many roots; no effervescence; mildly alkaline; abrupt smooth boundary.

B21t--7 to 20 inches; very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; strong fine and medium prismatic structure; hard, firm, sticky, very plastic; few roots; no effervescence; mildly alkaline; clear wavy boundary.

B22tca--20 to 32 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; strong fine and medium angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; few roots; strong effervescence; moderately alkaline; clear wavy boundary.

Cca--32 to 60 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; massive; hard, firm, very sticky, very plastic; few coarse roots; violent effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent. The mollic epipedon is greater than 16 inches thick.

The A horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is loam or clay loam. Reaction is neutral to moderately alkaline.

The B horizon has a color hue of 10YR, value of 3 through 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is clay loam or clay. Reaction is mildly or moderately alkaline.

The C horizon has a color hue of 10YR. Texture is clay or clay loam.

Cadoma Series

The Cadoma series consists of moderately deep, well drained, slowly permeable soils. They are located in basins. They have formed in alluvium. Slopes are 0 to 15 percent.

Typical pedon of Cadoma silty clay loam, 0 to 15 percent slopes, SW¼, SE¼, sec. 10, T. 44N., R. 96W., in an area of mapping unit 70.

A1--0 to 2 inches; pale brown (10YR 6/3) silty clay loam, olive brown (2.5Y 4/4) moist; moderate thin platy structure parting to moderate very fine granular structure; soft, friable, sticky, plastic; few roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

B1--3 to 4 inches; pale brown (10YR 6/3) silty clay loam, yellowish brown (10YR 5/4) moist; moderate coarse angular blocky structure; hard, firm, very sticky, very plastic; few roots; slight effervescence; very strongly alkaline; abrupt smooth boundary.

B2--4 to 13 inches; light brownish gray (2.5Y 6/2) silty clay, brown (10YR 5/3) moist; moderate coarse prismatic structure parting to moderate medium angular blocky structure; very hard, firm, very sticky, very plastic; few roots; slight effervescence; very strongly alkaline; clear wavy boundary.

B3--13 to 18 inches; light brownish gray (2.5Y 6/2) silty clay, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; hard, firm, very sticky, very plastic; slight effervescence; very strongly alkaline; clear wavy boundary.

C1cs--18 to 37 inches; light gray (2.5Y 7/2) silty clay loam, brown (10YR 5/3) moist; massive; hard, friable, sticky, plastic; few roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

C2r--37 inches; shale bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is silty clay loam, clay or silty clay.

The B and C horizons have a color hue of 10YR or 2.5Y, value of 6 or 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is silty clay loam, silty clay, or clay.

Clifterson Series

The Clifterson series consists of deep, somewhat excessively drained, rapidly permeable soils. They are located on alluvial fans or terrace shoulders. Slopes are 3 to 20 percent.

Typical pedon of Clifterson very gravelly loam, 3 to 20 percent slopes, SE¼, SE¼, sec. 22, T. 51N., R. 98W., in an area of mapping unit 315.

A1--0 to 2 inches; light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; gradual smooth boundary.

C1ca-2 to 10 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky, nonplastic; many roots; strong effervescence; moderately alkaline; gradual smooth boundary.

C2ca--10 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky, nonplastic; few roots; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 35 to 60 percent in the control section.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 through 6 moist), and chroma of 2 or 3 dry or moist. Texture is gravelly or very gravelly loam.

The C horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 through 6 moist), chroma of 2 or 3 dry or moist. Texture is very gravelly or very cobbly sandy loam or loam.

Cushman Series

The Cushman series consists of moderately deep, well drained, moderately permeable soils. They occur on uplands and terraces. They have formed in alluvium derived from sandstone and shale. Slopes are 3 to 15 percent.

Typical pedon of Cushman loam, 3 to 15 percent slopes, NW¼, NW¼, sec. 2, T. 47N., R. 98W., in an area of mapping unit 708.

A1--0 to 3 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium platy structure and moderate fine granular structure; slightly hard, friable, nonsticky, nonplastic; many roots; no effervescence; mildly alkaline; clear wavy boundary.

B1--3 to 7 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many roots; no effervescence; moderately alkaline; gradual irregular boundary.

B2t--7 to 14 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; very hard, friable, sticky, plastic; many roots; no effervescence; moderately alkaline; gradual irregular boundary.

B3--14 to 18 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure parting to moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many roots; no effervescence; moderately alkaline; gradual wavy boundary.

Cca--18 to 24 inches; very pale brown (10YR 7/3) channery sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few roots; strong effervescence; strongly alkaline; gradual irregular boundary.

Cr--24 to 30 inches; light gray (10YR 7/2) soft, fractured sandstone, mixed pale brown and light yellowish brown (10YR 6/3 and 10YR 6/4) moist; strong effervescence; strongly alkaline. (Observed to 30-inch depth)

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 20 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam.

Cushman Series--Continued

The B horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam or loam.

The C horizon has a color hue of 10YR or 2.5Y. Texture is loam, clay loam, or sandy loam.

Delphill Series

The Delphill series consists of moderately deep, well drained, moderately permeable soils. They are generally located on convex interfluves. They have formed in alluvium and residuum from sedimentary rock. Slopes are 3 to 15 percent.

Typical pedon of Delphill loam, 2 to 15 percent slopes, center, sec. 21, T. 46N., R. 99W., in an area of mapping unit 723.

A1--0 to 3 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many roots; slight effervescence; moderately alkaline; gradual smooth boundary.

AC--3 to 7 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; many roots; strong effervescence; moderately alkaline; gradual smooth boundary.

C1ca--7 to 20 inches; light gray (10YR 7/2) loam, pale brown (10YR 6/3) moist; weak medium to coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many roots; a few krotovinas; lime coatings on ped surfaces; violent effervescence; moderately alkaline; gradual smooth boundary.

C2ca--20 to 36 inches; light gray (10YR 7/2) loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; few roots; violent effervescence; moderately alkaline; abrupt wavy boundary.

C3r--36 inches; soft, calcareous siltstone.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 20 percent.

The A horizon has a color hue of 10YR, value of 5 through 7 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam or clay loam.

The C horizon has a color hue of 10YR, value of 6 or 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is loam or clay loam.

Diamondville Series

The Diamondville series consists of moderately deep, well drained, moderately permeable soils. They are located on footslopes, sideslopes, and ridges. They have formed in residuum and local alluvium derived from mixed sedimentary deposits. Slopes are 3 to 20 percent.

Typical pedon of Diamondville loam, 3 to 20 percent slopes, 500 feet north of center, sec. 16, T. 46N., R. 99W., in an area of mapping unit 730.

A--0 to 3 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many roots; no effervescence; neutral; clear wavy boundary.

B21t--3 to 8 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky, plastic; many roots; no effervescence; mildly alkaline; gradual wavy boundary.

B22tca--8 to 12 inches; brown (10YR 5/3) loam, brown (10YR 4/3 and 10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, sticky, plastic; common roots; slight effervescence; moderately alkaline; gradual wavy boundary.

C1ca--12 to 18 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; common roots; slight effervescence; moderately alkaline; clear wavy boundary.

C2ca--18 to 26 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; few roots; strong effervescence; moderately alkaline; abrupt smooth boundary.

C3r--26 inches; fractured, calcareous sandstone.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 20 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is loam or clay loam.

The C horizon has a color hue of 10YR or 2.5Y. Texture is loam, clay loam, or sandy loam.

Diamondville Series--Continued

These soils constitute a taxadjunct of the Diamondville series. They are similar to the Diamondville soils a strictly defined and their use and management interpretations are the same, but they have a slightly thinner solum.

Effington Series

The Effington series consists of deep, moderately well drained, slowly permeable soils. They are located in bottomlands and on the lower end of alluvial fans. They have formed in alluvium derived dominantly from shale. Slopes are 0 to 6 percent.

Typical pedon of Effington silt loam, 0 to 6 percent slopes, NW¼, SE¼, sec. 28, T. 47N., R. 97W., in an area of mapping unit 604.

A2--0 to 2 inches; light gray (2.5Y 7/2) silt loam, grayish brown (2.5Y 5/2) moist; weak thin platy structure over moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; clear wavy boundary.

B1--2 to 4 inches; pale brown (10YR 6/3) silty clay loam, yellowish brown (10YR 5/4) moist; weak medium platy and moderate medium granular structure; hard, friable, sticky, plastic; slight effervescence; strongly alkaline; many roots; gradual wavy boundary.

B2t--4 to 13 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; weak coarse prismatic structure parting to strong medium subangular blocky structure; common roots; very hard, firm, very sticky, very plastic; slight effervescence; very strongly alkaline; clear wavy boundary.

B3tca--13 to 24 inches; light brownish gray with few fine white gypsum coatings (2.5Y 6/2 and 2.5Y 8.2) silty clay, grayish brown (2.5Y 5/2) moist; moderate medium subangular blocky structure; hard, friable, sticky, plastic; slight effervescence; moderately alkaline; gradual wavy boundary.

Ccs--24 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; very hard, friable, sticky, plastic; slight effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 through 6 moist), and chroma of 2 or 3 dry or moist. Texture is silt loam or silty clay loam. Reaction is moderately or strongly alkaline.

The B horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is silty clay loam or clay. Reaction is strong or very strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y, value of 6 or 8 (4 through 6 moist), and chroma of 2 or 3 dry or moist. Texture is silt loam, silty clay loam, or silty clay. Reaction is strongly or very strongly alkaline.

Effington Variant

The Effington Variant soils are moderately deep, well drained, and very slowly permeable. They are located on lower alluvial fans and bottomlands. Slopes are 0 to 10 percent.

Typical pedon of Effington Variant, 0 to 10 percent slopes, SW¼, SE¼, sec. 28, T. 47N., R. 97W., in an area of mapping unit 604.

A2--0 to 1 inch; light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; weak thin platy structure parting to strong fine granular structure; soft, very friable, slightly sticky, slightly plastic; slight effervescence; moderately alkaline; clear wavy boundary.

B1--1 to 3 inches; light yellowish brown (10YR 6/4) silty clay loam, yellowish brown (10YR 5/4) moist; moderate coarse platy structure parting to moderate medium granular structure; hard, friable, sticky, plastic; slight effervescence; strongly alkaline; gradual wavy boundary.

B2t--3 to 12 inches; pale brown (10YR 6/3) silty clay, yellowish brown (10YR 5/4) moist; weak very coarse prismatic structure parting to moderate medium subangular blocky structure; very hard, firm, sticky, plastic; slight effervescence; very strongly alkaline; clear wavy boundary.

C1cs--12 to 20 inches; light brownish gray with light gray gypsum coatings on ped surfaces (10YR 6/2 w 10YR 7/2) silty clay, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky, plastic; slight effervescence; moderately alkaline; gradual wavy boundary.

C2--20 to 22 inches; light gray and light brownish gray (2.5Y 7/2 and 2.5Y 6/2) silty clay loam, light brownish gray (2.5Y 6/2) moist; massive; hard, friable, sticky, plastic; slight effervescence; moderately alkaline; gradual wavy boundary.

C3r--22 to 24 inches; weathered platy sandy shale; slight effervescence; mildly alkaline; gradual wavy boundary.

C4r--24 to 30 inches; weathered platy sandy shale; no effervescence; neutral; abrupt smooth boundary.

R--30 inches; hard sandstone.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is silty clay loam, silt loam, or silty clay.

Effington Variant--Continued

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is silty clay or silty clay loam. Reaction is very strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y.

Epsie Series

The Epsie series consists of shallow, well drained, very slowly permeable soils. They occur on clay shale uplands. They have formed in residuum and local alluvium. Slopes are 0 to 45 percent.

Typical pedon of Epsie silty clay, 0 to 45 percent slopes, SW¼, SE¼, sec. 8, T. 44N., R. 96W., in an area of mapping unit 752.

A1--0 to 3 inches; light brownish gray (2.5Y 6/2) silty clay, very dark gray (10YR 3/1) moist; moderate thin platy structure parting to moderate fine granular structure; hard, friable, very sticky, very plastic; slight effervescence; moderately alkaline; abrupt smooth boundary.

C1cs--3 to 16 inches; grayish brown (2.5Y 5/2) silty clay, dark gray (10YR 4/1) moist; weak coarse prismatic structure parting to moderate coarse angular blocky structure; very hard, very firm, very sticky, very plastic; strong effervescence; moderately alkaline; clear wavy boundary.

C2r--16 ot 28 inches; soft weathered shale; light brownish gray with light yellowish brown mottles (2.5Y 6/2 with 2.5Y 6/4) silty clay with some pockets of very fine sandy loam and silt loam, very dark gray (10YR 3/1) moist; very hard, friable, very sticky, very plastic; strongly alkaline.

Depth to bedrock ranges from 6 to 20 inches. Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 2.5Y or 10YR, value of 5 or 6 (3 through 5 moist), and chroma of 1 or 2 dry or moist. Texture is clay, silty clay, or silty clay loam.

The C horizon has a color hue of 2.5Y or 10YR, value of 5 or 6 (3 through 5 moist), and chroma of 1 or 2 dry or moist. Texture is silty clay or clay.

Forelle Series

The Forelle series consists of deep, well drained, moderately permeable soils. They are located on alluvial fans. They have formed in alluvium derived from sedimentary rock. Slopes are 3 to 15 percent.

Typical pedon of Forelle loam, 3 to 15 percent slopes, center, sec. 28, T. 46N., R. 99W., in an area of mapping unit 730.

A1--0 to 4 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak thick platy structure; slightly hard, friable, slightly sticky, slightly plastic; no effervescence; neutral; clear smooth boundary.

B2t--4 to 16 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; clear smooth boundary.

B3--16 to 30 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; gradual smooth boundary.

Cca--30 to 60 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; slight effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 20 percent.

The A horizon has a color hue of 7.5YR through 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam, very fine sandy loam, or light silty clay loam.

The B horizon has a color hue of 7.5YR through 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam or silty clay loam.

The C horizon has a color hue of 7.5YR through 2.5Y. Texture is loam or clay loam.

Fort Collins Series

The Fort Collins series consists of deep, well drained, moderately permeable soils. They are located on alluvial fans and terraces. They have formed in alluvium derived from sedimentary rock. Slopes are 0 to 10 percent.

Typical pedon of Fort Collins loam, 0 to 10 percent slopes, NW¼, sec. 6, T. 45N., R. 98W., in an area of mapping unit 701.

A1--0 to 5 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many roots; no effervescence; neutral; clear wavy boundary.

B1--5 to 8 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; many roots; no effervescence; neutral; clear wavy boundary.

B2t--8 to 18 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky, slightly plastic; many roots; continuous clay films; no effervescence; mildly alkaline; gradual wavy boundary.

B3tca--18 to 20 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few roots; thin discontinuous clay films; weak effervescence; moderately alkaline; gradual irregular boundary.

C1ca--20 to 30 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; few roots; strong effervescence; moderately alkaline; gradual irregular boundary.

C2ca--30 to 60 inches; light gray (10YR 7/2) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; no roots; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR, value of 5 through 7 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam, fine sandy loam, or silt loam.

The B horizon has a color hue of 10YR, value of 5 through 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam or clay loam.

The C horizon has a color hue of 10YR. Texture is loam, sandy loam, or sandy clay loam.

Garland Series

The Garland series consists of deep, well drained, moderately permeable soils. They are located on alluvial fans and river terraces. They have formed in alluvium. Slopes are 0 to 10 percent.

Typical pedon of Garland loam, 0 to 10 percent slopes, NE¼, NE¼, sec. 27, T. 51N., R. 98W., in an area of mapping unit 11T.

A--0 to 3 inches; light brownish gray (10YR 6/2) loam, brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable-slightly sticky, slightly plastic; many roots; no effervescence; moderately alkaline; clear wavy boundary.

B2t--3 to 14 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky structure; slightly hard, friable, sticky, plastic; many roots; no effervescence; moderately alkaline; gradual smooth boundary.

B3--14 to 21 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few roots; slight effervescence; moderately alkaline; gradual irregular boundary.

C1ca--21 to 30 inches; very pale brown (10YR 7/3) gravelly sandy clay loam, brown (10YR 5/3) moist; weak, coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; 20 percent gravel; violent effervescence; strongly alkaline; gradual smooth boundary.

IIC2ca--30 to 60 inches; light gray (10YR 7/2) very gravelly loamy sand, brown (10YR 5/3) moist; massive; loose, friable, nonsticky, nonplastic; violent effervescence; strongly alkaline.

Depth to sand and gravel substratum ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent above the gravel substratum.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam or clay loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 3 or 4 dry or moist. Texture is loam, clay loam, or sandy clay loam.

The C horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist.

Gaynor Series

The Gaynor series consists of moderately deep, well drained, slowly permeable soils. They are located on residual uplands. They have formed in residuum from shale. Slopes are 3 to 15 percent.

Typical pedon of Gaynor clay, 3 to 15 percent slopes, center of E½, sec. 31, T. 43N., R. 95W., in an area of mapping unit 753.

A--0 to 4 inches; grayish brown (2.5Y 5/2) clay, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; slightly hard, firm, very sticky, very plastic; common roots; slight effervescence; mildly alkaline; abrupt smooth boundary.

AC--4 to 12 inches; grayish brown (2.5Y 5/2) clay, very dark grayish brown (10YR 3/2) moist; strong fine and medium prismatic structure; extremely hard, extremely firm, very sticky, very plastic; common roots; strong effervescence; moderately alkaline; clear wavy boundary.

C1ca--12 to 26 inches; grayish brown (2.5Y 5/2) clay, mixed very dark grayish brown and black (2.5Y 3/2 and 2.5Y 2/0) moist; strong fine and medium prismatic structure; extremely hard, extremely firm, very sticky, very plastic; common roots; violent effervescence; strongly alkaline; clear wavy boundary.

C2r--26 inches; shale bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR through 5Y, value of 5 through 7 (3 through 5 moist), and chroma of 1 through 3 dry or moist. Texture is clay or silty clay.

The C horizon has a color hue of 10YR through 5Y. Texture is clay or silty clay. Reaction is moderately or strongly alkaline.

Gilispie Series

The Gilispie series consists of shallow, well drained, moderately permeable soils. They are located on dissected residual uplands. They have formed in residuum from andesite bedrock. Slopes are 3 to 55 percent.

Typical pedon of Gilispie cobbly loam, 3 to 45 percent slopes, NW¼, SE¼, sec. 35, T. 44N., R. 102W., in an area of mapping unit 818.

A1--0 to 2 inches; dark gray (10YR 4/1) cobbly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; loose, very friable, nonsticky, nonplastic; many roots; no effervescence; neutral; clear wavy boundary.

B1--2 to 9 inches; dark gray (10YR 4/1) cobbly clay loam, very dark brown (10YR 2/2) moist; weak fine prismatic structure parting to weak fine angular blocky structure; hard, friable, sticky, plastic; many roots; no effervescence; neutral; clear wavy boundary.

B2t--9 to 19 inches; grayish brown (10YR 5/1) cobbly clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium angular blocky structure; hard, firm, sticky, plastic; thick continuous clay films; many roots; no effervescence; neutral; abrupt wavy boundary.

R--19 inches; andesite bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 15 to 35 percent.

The A horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is cobbly loam or gravelly loam.

The B horizon has a color hue of 10YR, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is cobbly loam, cobbly clay loam, gravelly clay loam, or gravelly loam.

Glenton Series

The Glenton series consists of deep, well drained, moderately permeable soils. They are located on floodplains and alluvial fans. They have formed in calcareous alluvium derived from sandstone and shale. Slopes are 0 to 10 percent.

Typical pedon of Glenton loam, 0 to 10 percent slopes, NW¼, sec. 20, T. 50N., R. 98W., in an area of mapping unit 45.

A1--0 to 4 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium to thick platy structure; soft, very friable, nonsticky, nonplastic; many roots; slight effervescence; moderately alkaline; gradual smooth boundary.

C1--4 to 14 inches; stratified light brownish gray and light brown (2.5Y 6/2 and 7.5YR 6/4) fine sandy loam, grayish brown and brown (2.5Y 5/2 and 7.5YR 5/4) moist; massive; soft, very friable, nonsticky, nonplastic; many roots; slight effervescence; moderately alkaline; gradual smooth boundary.

C2--14 to 31 inches; stratified light brownish gray and light brown (2.5Y 6/2 and 7.5YR 6/4) fine sandy loam, sandy loam, and silt loam, grayish brown and brown (2.5Y 5/2 and 7.5YR 5/4) moist; massive; soft, very friable, nonsticky, nonplastic; common roots to 24 inches, few below; slight effervescence; moderately alkaline; gradual smooth boundary.

C3--31 to 47 inches; stratified pale brown and light brown (10YR 6/3 and 7.5YR 6/4) sandy loam with thin lenses of silt loam, brown (10YR 5/3 and 7.5YR 5/4) moist; massive; soft, very friable, nonsticky, nonplastic; slight effervescence; moderately alkaline; gradual smooth boundary.

C4--47 to 50 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; slight effervescence; strongly alkaline; gradual smooth boundary.

C5--50 to 60 inches; pale brown (10YR 6/3) fine sandy loam stratified with thin lenses of silt loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; slight effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR through 5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam, sandy clay loam, or very fine sandy loam.

The C horizon has a color hue of 10YR through 5Y. Texture is stratified sandy loam, sandy clay loam, and silt loam.

Gystrum Series

The Gystrum series consists of moderately deep, well drained, moderately permeable soils. They are located on residual uplands. They have formed in residuum from gysiferous bedrock. Slopes are 3 to 60 percent.

Typical pedon of Gystrum loam, 3 to 60 percent slopes, NW¼, SE¼, NE¼, sec. 27, T. 43N., R. 95W., in an area of mapping unit 445.

A1--0 to 3 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; weak medium platy structure parting to moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many roots; no effervescence; moderately alkaline; gradual wavy boundary.

B2--3 to 12 inches; pink (7.5YR 7/4) silty clay loam, brown (7.5YR 5/4) moist; weak coarse prismatic structure parting to weak coarse angular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; gradual wavy boundary.

C1cs--12 to 20 inches; pink with pinkish white lime coatings (7.5YR 7/4 and 7.5YR 8/2) silty clay loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard; slightly plastic; common roots; violent effervescence; moderately alkaline; gradual wavy boundary.

C2cs--20 to 26 inches; pink (7.5YR 7/4) silty clay loam, light brown (7.5YR 6/4) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; few roots; violent effervescence; moderately alkaline; gradual irregular boundary.

Crcs--26 inches; soft gypsiferous bedrock; strong effervescence; mildly alkaline.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 5 percent.

The A horizon has a color hue of 7.5YR or 10YR, value of 5 or 6 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam, very fine sandy loam, or silt loam. Reaction is mildly or moderately alkaline.

The B horizon has a color hue of 7.5YR or 10YR, value of 6 or 7 (5 or 6 moist), and chroma of 3 or 4 dry or moist. Texture is silty clay loam or silt loam. Reaction is mildly or moderately alkaline.

The C horizon has a color hue of 7.5YR or 10YR. Texture is silty clay loam or silt loam. Reaction is moderately or strongly alkaline.

Hoot Series

The Hoot series consists of shallow, somewhat excessively drained, moderately permeable soils. They are located on broken, eroded residual uplands. They have formed in residuum from interbedded sandstone and shale bedrock. Slopes are 3 to 60 percent.

Typical pedon of Hoot channery loam, 3 to 60 percent slopes, NW¼, NW¼, sec. 34, T. 45N., R. 95W., in an area of mapping unit 606.

A2--0 to 2 inches; light gray (2.5Y 7/2) channery loam, grayish brown (2.5Y 5/2) moist; weak medium platy structure; soft, very friable, nonsticky, nonplastic; many roots; vesicular pores; no effervescence; mildly alkaline; clear smooth boundary.

B2t--2 to 7 inches; pale brown (10YR 6/3) very channery clay loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure parting to moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; gradual wavy boundary.

Cca--7 to 16 inches; mixed white and light gray (2.5Y 8/2 and 2.5Y 7/2) very channery clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common roots; violent effervescence; moderately alkaline; gradual wavy boundary.

R--16 inches; soft weathered bedrock, upper 2 inches over hard sandstone.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 35 to 60 percent in the control section.

The A horizon has a color hue of 2.5Y or 10YR, value of 6 or 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is channery loam or channery sandy loam.

The B horizon has a color hue of 10YR, value of 6 or 7 (4 or 5 moist), and chroma of 3 or 4 dry or moist. Texture is very channery clay loam or very channery loam.

Judkins Series

The Judkins series consists of moderately deep, well drained, and moderately permeable soils. They are located on high mountain slopes and ridges. They have formed in residuum from sandstone. Slopes are 6 to 60 percent.

Typical pedon of Judkins stony silt loam, 6 to 60 percent slopes, SE¼, SE¼, sec. 30, T. 43N., R. 101W., in an area of mapping unit 870.

O1--2 to 1 inch; undecomposed forest litter; slightly acid; abrupt smooth boundary.

O2--1 to 0 inch; decomposed forest litter; neutral; abrupt smooth boundary.

A2--0 to 4 inches; light brownish gray (10YR 6/2) stony silt loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, friable, sticky, plastic; many roots; no effervescence; medium acid; clear wavy boundary.

B2t--4 to 11 inches; grayish brown (10YR 5/2) very stony silty clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine angular blocky structure; hard, firm, sticky, plastic; many roots; no effervescence; neutral; clear irregular boundary.

B3--11 to 22 inches; brown (10YR 5/3) very stony silty clay loam, dark yellowish brown (10YR 3/4 and 10YR 3/6) moist; weak fine subangular blocky structure; hard, firm, sticky, plastic; common roots; no effervescence; mildly alkaline; abrupt wavy boundary.

R--22 inches; hard sandstone bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 50 to 75 percent.

The A horizon has a color hue of 10YR, value of 4 to 6 (2 or 3 moist), and chroma of 2 or 3 dry or moist. Texture is stony silt loam or stony loam.

The B horizon has a color hue of 10YR, value of 4 through 6 (3 or 4 moist), and chroma of 2 through 4 dry or moist. Texture is stony clay loam or stony silty clay loam.

These soils constitute a taxadjunct of the Judkins series. They are similar to the Judkins soils as strictly defined and most use and management interpretations are the same, but they are less acid and lack and A & B horizon.

Kim Series

The Kim series consists of deep, well drained, moderately permeable soils. They are located on alluvial fans, terraces, and on loessial hills. They have formed in alluvium and loess. Slopes are 0 to 15 percent.

Typical pedon of Kim loam, 0 to 15 percent slopes, SW¼, NE¼, sec. 29, T. 42N., R. 95W., in an area of mapping unit 705.

A11--0 to 2 inches; brown (10YR 5/3) loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

A12--2 to 5 inches; light brownish gray (10YR 6/2) loam, brown (10YR 4/3) moist; moderate thick platy structure; soft, very friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; clear smooth boundary.

AC--5 to 21 inches; light brownish gray (10YR 6/2) loam, brown (10YR 4/3) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky, slightly plastic; few roots; strong effervescence; moderately alkaline; clear wavy boundary.

C1--21 to 26 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few roots; slight effervescence; moderately alkaline; clear wavy boundary.

C2--26 to 60 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky, slightly plastic; few roots to 40 inches, none below; slight effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is loam, silt loam, or light clay loam.

The C horizon has a color hue of 10YR or 2.5Y. Texture is loam or clay loam.

Larim Series

The Larim series consists of deep, well drained, moderately permeable soils. They are located on stream terraces and moraines. They have formed in alluvium and glacial drift. Slopes are 3 to 25 percent.

Typical pedon of Larim gravelly loam, 3 to 25 percent slopes, NE¼, NW¼, sec. 32, T. 44N., R. 99W., in an area of mapping unit 426.

A1--0 to 3 inches; light brownish gray (10YR 6/2) gravelly loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; many roots; no effervescence; mildly alkaline; clear smooth boundary.

B21t--3 to 6 inches; brown (10YR 5/3) very gravelly and cobbly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium and fine subangular blocky structure; hard, friable, sticky, plastic; many roots; no effervescence; mildly alkaline; gradual wavy boundary.

B22tca--6 to 11 inches; pale brown (10YR 6/3) very gravelly and cobbly clay loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky, plastic; common roots; lime coatings on lower surfaces of gravel fragments; strong effervescence; moderately alkaline; gradual wavy boundary.

C1ca--11 to 18 inches; light gray (10YR 7/1) very gravelly and cobbly loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common roots; violent effervescence; strongly alkaline; clear wavy boundary.

IIC2ca--18 to 60 inches; light gray (10YR 7/2) very gravelly loamy sand, light brownish gray (10YR 6/2) moist; massive; loose, very friable, nonsticky, nonplastic; few roots extend a few inches into top of horizon; violent effervescence; strongly alkaline.

Depth to sand and gravel substratum ranges from 12 to 24 inches. Content of coarse fragments ranges from 35 to 60 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 4 through 6 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is cobbly loam, gravelly loam, or gravelly fine sandy loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 3 or 4 dry or moist. Texture is gravelly or cobbly loam.

Larimer Series

The Larimer series consists of deep, well drained, moderately permeable soils. They are located on terraces and alluvial fans. They have formed in alluvium. Slopes are 0 to 8 percent.

Typical pedon of Larimer sandy loam, 0 to 8 percent slopes, NW¼, sec. 24, T. 45N., R. 97W., in an area of mapping unit 11L.

A1--0 to 3 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; 5 percent gravel; no effervescence; neutral, clear smooth boundary.

B1--3 to 6 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; 5 percent gravel; no effervescence; neutral; clear smooth boundary.

B2t--6 to 18 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 4/4) moist; moderate medium prismatic breaking to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; 5 percent gravel; thin continuous clay films; no effervescence; mildly alkaline; clear wavy boundary.

B3ca--18 to 20 inches; light brown (7.5YR 6/4) sandy clay loam, brown (10YR 5/4) moist; weak medium prismatic breaking to weak medium subangular blocky structure; soft, very friable, slightly sticky, slighty plastic; 10 percent gravel; slight effervescence; moderately alkaline; clear wavy boundary.

C1ca--20 to 30 inches; very pale brown (10YR 7/3) gravelly sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky, nonplastic; 30 percent gravel; lime coatings on pebbles; strongly effervescence; moderately alkaline; clear irregular boundary.

IIC2ca--30 to 60 inches; very gravelly sand; massive; lime coatings on pebbles and cobbles; strong effervescence.

Depth to sand and gravel substratum ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 35 percent above the sand and gravel substratum.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam or sandy loam.

The B horizon has a color hue of 7.5YR through 2.5Y, value of 4 through 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam, clay loam, or sandy clay loam.

Larimer Series--Continued

The C horizon has a color hue of 10YR or 2.5Y, value of 6 through 8 (5 through 7 moist), and chroma of 2 through 4 dry or moist. Texture is gravelly sandy clay loam or gravelly clay loam.

Mayoworth Series

The Mayoworth series consists of moderately deep, well drained, slowly permeable soils. They are located on ridges and mountain sideslopes. They have formed in residuum from moderately fine to fine-textured sedimentary rock. Slopes are 3 to 45 percent.

Typical pedon of Mayoworth clay loam, 3 to 45 percent slopes, NE¼, NW¼, sec. 35, T. 45N., R. 101W., in an area of mapping unit 814.

O1--1 to 0 inch; organic mulch.

A1--0 to 7 inches; dark brown (10YR 4/3) clay loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, sticky, plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

B21t--7 to 14 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; strong fine angular blocky structure; very hard, very firm, very sticky, very plastic; common roots; no effervescence; neutral; clear smooth boundary.

B22t--14 to 17 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong medium angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; few roots; no effervescence; neutral; gradual wavy boundary.

B3--17 to 24 inches; olive gray (5Y 5/2) clay, dark olive gray (5Y 3/2) moist; weak medium angular blocky structure; very hard, very firm, very sticky, very plastic; no effervescence; neutral; gradual wavy boundary.

Cr--24 to 30 inches; soft siltstone.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR through 5Y, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is clay loam, clay, or silty clay.

The B horizon has a color hue of 10YR through 5Y, value of 5 or 6 (3 or 4 moist), and chroma of 1 through 3 dry or moist. Texture is clay or clay loam.

Merino Series

The Merino series consists of shallow, well drained, moderately permeable soils. They are located on high mountain slopes. They have formed in residuum from igneous rock. Slopes are 6 to 60 percent.

Typical pedon of Merino gravelly sandy clay loam, 6 to 60 percent slopes, NE¼, NE¼, sec. 25, T. 43N., R. 102W., in an area of mapping unit 804.

A11--0 to 3 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure parting to weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many roots; no effervescence; mildly alkaline; abrupt smooth boundary.

A12--3 to 9 inches; light brownish gray (10YR 6/2) very gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, sticky, plastic; many roots; no effervescence; mildly alkaline; clear wavy boundary.

C--9 to 15 inches; pale brown (10YR 6/3) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, sticky, plastic; common roots; no effervescence; mildly alkaline; abrupt wavy boundary.

R--15 inches; Andesite bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 35 to 60 percent.

The A horizon has a color hue of 10YR, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3 dry or moist. Texture is gravelly sandy clay loam, gravelly clay loam, or gravelly loam.

The C horizon has a color hue of 10YR, value of 5 or 6 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is very gravelly sandy clay loam or very gravelly clay loam.

Millerlake Series

The Millerlake series consists of deep, well drained, moderately permeable soils. They are located on alluvial fans, toe slopes, and glacial outwash deposits. Slopes are 3 to 30 percent.

Typical pedon of Millerlake loam, 3 to 30 percent slopes, NE¼, SW¼, sec. 18, T. 45N., R. 101W., in an area of mapping unit 850.

A11--0 to 2 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; soft, very friable, nonsticky, slightly plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

A12--2 to 5 inches; gray (10YR 5/1) loam, black (10YR 2/1) moist; moderate thin platy structure; slightly hard, very friable, nonsticky, plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

B21t--5 to 12 inches; dark gray (10YR 4/1) clay loam, black (10YR 2/1) moist; moderate coarse prismatic structure parting to moderate medium angular blocky structure; hard, firm, sticky, plastic; many roots; no effervescence; neutral; clear wavy boundary.

B22t--12 to 18 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate fine angular blocky structure; hard, firm, sticky, plastic; common roots; no effervescence; mildly alkaline; clear wavy boundary.

B23t--18 to 22 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; few roots; no effervescence; mildly alkaline; clear wavy boundary.

B3--22 to 36 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky, nonplastic; no effervescence; mildly alkaline; clear wavy boundary.

C1ca--36 to 41 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky, nonplastic; slight effervescence; lime coatings on pebbles; moderately alkaline; clear wavy boundary.

IIC2--41 to 60 inches; very gravelly sandy loam; slight effervescence.

Content of coarse fragments ranges from 0 to 25 percent. The mollic epipedon is greater than 16 inches thick.

Millerlake Series--Continued

The A horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is loam, silt loam, or clay loam.

The B horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is loam, clay loam, gravelly loam, or gravelly clay loam.

The C horizon has a color hue of 10YR. Texture is loam, clay loam, gravelly loam, or gravelly clay loam.

Mudray Series

The Mudray series consists of shallow, well drained, slowly permeable soils. They are located on alluvial fans and upland slopes. They have formed in residuum and alluvium derived dominantly from very strongly alkaline shales with an admixture of sandy wash or eolian sediments. Slopes are 0 to 15 percent.

Typical pedon of Mudray very fine sandy loam, 0 to 15 percent slopes, SE¼, SE¼, sec. 23, T. 49N., R. 98W., in an area of mapping unit 645.

A2--0 to 2 inches; pink (5YR 7/3) very fine sandy loam, reddish brown (5YR 5/3) moist; moderate medium platy structure parting to weak medium granular structure; slightly hard, friable, nonsticky, nonplastic; common roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

B21t--2 to 6 inches; reddish brown (5YR 5/4) sandy clay, reddish brown (5YR 4/3) moist; moderate medium columnar structure; very hard, firm, sticky, plastic; common roots; slight effervescence; very strongly alkaline; gradual wavy boundary.

B22t--6 to 9 inches; reddish brown (5YR 5/3) sandy clay, reddish brown (5YR 5/4) moist; weak coarse columnar structure parting to moderate medium angular blocky structure; very hard, firm, sticky, plastic; common roots; slight effervescence; very strongly alkaline; gradual wavy boundary.

C1ca--9 to 15 inches; light reddish brown (5YR 5/3) sandy clay loam, reddish brown (5YR 5/4) moist; massive; very hard, firm, slightly sticky, slightly plastic; few roots; strong effervescence; very strongly alkaline; clear wavy boundary.

C2r--15 inches; interbedded shale and sandstone bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 5YR or 7.5YR, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is very fine sandy loam, loam, or silt loam. Reaction is mildly to very strongly alkaline.

The B horizon has a color hue of 2.5YR through 7.5YR, value of 5 or 6 (4 or 5 moist), and chroma of 3 or 4 dry or moist. Texture is sandy clay or sandy clay loam. Reaction is very strongly alkaline.

The C horizon has a color hue of 2.5YR through 7.5YR. Reaction is very strongly alkaline.

Nelson Series

The Nelson series consists of moderately deep, well drained soils with moderately rapid permeability. They are located on upland hills and ridges. They have formed in residuum from sandstone. Slopes are 3 to 12 percent.

Typical profile of Nelson fine sandy loam, 3 to 12 percent slopes, NW¼, sec. 17, T. 45N., R. 96W., in an area of mapping unit 346.

A1--0 to 3 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many roots; strong effervescence; moderately alkaline; clear wavy boundary.

AC--3 to 9 inches; pale brown (10YR 6/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; very weak coarse subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many roots; strong effervescence; moderately alkaline; clear wavy boundary.

C1--9 to 28 inches; light gray (10YR 7/2) loamy very fine sand, mixed brown and yellowish brown (10YR 5/3 and 10YR 5/4) moist; massive; loose, very friable, nonsticky, nonplastic; few roots; strong effervescence; moderately alkaline; abrupt smooth boundary.

Cr--28 inches; soft, calcareous sandstone.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3 dry or moist. Texture is fine sandy loam or sandy loam. Reaction is mildly to strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Texture is fine sandy loam or loamy very fine sand. Reaction is moderately or strongly alkaline.

Neville Series

The Neville series consists of deep, well drained, moderately permeable soils. They are located in basins, sideslopes, and alluvial fans. They have formed in alluvium derived from reddish sedimentary rock. Slopes are 2 to 30 percent.

Typical pedon of Neville very fine sandy loam, 2 to 30 percent slopes, SE¼, SW¼, NE¼, sec. 2, T. 43N., R. 96W., in an area of mapping unit 389.

A1--0 to 5 inches; reddish brown (5YR 5/4) very fine sandy loam, dark reddish brown (5YR 3/4) moist; moderate thin platy structure parting to moderate fine granular structure; loose, very friable, nonsticky, nonplastic; slight effervescence; moderately alkaline; abrupt smooth boundary.

C1--5 to 16 inches; yellowish red (5YR 5/6) loam, dark red (2.5YR 3/6) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline; clear wavy boundary.

C2--16 to 60 inches; reddish brown (5YR 5/4) loam, red (2.5YR 4/6) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 2.5YR through 7.5YR, value of 5 through 7 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is very fine sandy loam, or loam. Reaction is mildly to strongly alkaline.

The C horizon has a color hue of 2.5YR or 5YR. Reaction is moderately or strongly alkaline.

Nielsen Series

The Nielsen series consists of shallow, well drained, moderately permeable soils. They occur on mountain ridges and sideslopes. They have formed in residuum from sedimentary rock. Slopes are 3 to 60 percent.

Typical pedon of Nielsen channery loam, 3 to 60 percent slopes, SW¼, SW¼, sec. 22, T. 45N., R. 101W., in an area of mapping unit 810.

A11--0 to 3 inches; dark grayish brown (10YR 4/2) channery loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky, slightly plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

A12--3 to 7 inches; dark grayish brown (10YR 4/2) channery loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; soft, friable, nonsticky, slightly plastic; many roots; no effervescence; neutral; clear smooth boundary.

B2t--7 to 12 inches; grayish brown (10YR 5/2) very channery clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common roots; no effervescence; neutral; abrupt wavy boundary.

R--12 inches; sedimentary bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 35 to 60 percent.

The A horizon has a color hue of 10YR, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is channery loam, channery very fine sandy loam, or channery silt loam.

The B horizon has a color hue of 10YR, value of 4 through 6 (2 through 4 moist), and chroma of 2 or 3 dry or moist. Texture is very channery loam or very channery clay loam.

Nielsen Variant

The Nielsen Variant consists of shallow, well drained, slowly permeable soils. They occur on mountain sideslopes and ridges. They have formed in residuum from igneous. Slopes are 6 to 60 percent.

Typical pedon of Nielsen Variant clay loam, 6 to 60 percent slopes, NE¼, NE¼, NE¼, sec. 36, T. 44N., R. 102W., in an area of mapping unit 872.

A--0 to 2 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; hard, firm, sticky, plastic; no effervescence; mildly alkaline; abrupt smooth boundary.

B--2 to 16 inches; grayish brown (10YR 5/2) clay, dark brown (10YR 3/3) moist; strong medium prismatic structure; extremely hard, extremely firm, very sticky, very plastic; roots between peds; no effervescence; mildly alkaline; abrupt smooth boundary.

R--16 inches; igneous bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 20 percent.

The A horizon has a color hue of 10YR or 7.5YR, value of 4 or 5 (2 or 3 moist), and chroma of 2 or 3 dry or moist. Texture is clay loam, clay, or silty clay loam.

The C horizon has a color hue of 10YR or 7.5YR. Texture is clay.

Nihill Series

The Nihill series consists of deep, well drained, moderately permeable soils. They are located on terraces and sideslopes. They have formed in gravelly alluvium. Slopes are 3 to 45 percent.

Typical pedon of Nihill gravelly loam, 3 to 45 percent slopes, SW¼, NW¼, sec. 12, T. 46N., R. 97W., in an area of mapping unit 324.

A1--0 to 2 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; loose, very friable, nonsticky, nonplastic; no effervescence; mildly alkaline; abrupt smooth boundary.

C1--2 to 5 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline; abrupt smooth boundary.

C2--5 to 30 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline; abrupt wavy boundary.

C3--30 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; massive; hard, firm, sticky, plastic; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 35 to 70 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 4 through 6 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is gravelly very fine sandy loam, gravelly loam, or gravelly sandy loam.

The C horizon has a color hue of 10YR or 2.5Y, value of 6 through 8 (5 or 6 moist), and chroma of 1 through 4 dry or moist. Texture is very gravelly loam or very gravelly sandy loam.

Oceanet Series

The Oceanet series consists of shallow, well drained soils with moderately rapid permeability. They are located on upland hills and ridges. They have formed in residuum from sedimentary rock, predominantly sandstone. Slopes are 0 to 40 percent.

Typical pedon of Oceanet sandy loam, 3 to 40 percent slopes, center SW¼, sec. 35, T. 45N., R. 95W., in an area of mapping unit 112.

A1--0 to 3 inches; very pale brown (10YR 7/3) sandy loam, grayish brown (10YR 5/2) moist; weak medium platy structure; soft, very friable, nonsticky, nonplastic; many roots; no effervescence; mildly alkaline; gradual wavy boundary.

C1--3 to 9 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak coarse prismatic structure; soft, very friable, nonsticky, nonplastic; many roots; slight effervescence; moderately alkaline; clear wavy boundary.

C2--9 to 12 inches; light gray (10YR 7/2) loamy sand, light brownish gray (10YR 6/2) moist; massive; very soft, very friable, nonsticky, nonplastic; many roots; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr--12 inches; mixed white and light gray (2.5Y 8/2 and 2.5Y 7/2) soft calcareous sandstone, mixed light gray and light brownish gray (2.5Y 7/2 and 2.5Y 6/2) moist; strong effervescence; strongly alkaline.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 25 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 to 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is fine sandy loam, sandy loam, or loamy fine sand.

The C horizon has a color hue of 10YR or 2.5Y. Texture is sandy loam or loamy sand.

Olney Series

The Olney series consists of deep, well drained soils with moderate to moderately rapid permeability. They are located on alluvial fans and foot slopes. They have formed in alluvium derived dominantly from sedimentary rock. Slopes are 0 to 10 percent.

Typical pedon of Olney sandy loam, 0 to 10 percent slopes, NW¼, sec. 2, T. 45N., R. 97W., in an area of mapping unit 93.

A1--0 to 4 inches; pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; no effervescence; neutral; clear smooth boundary.

B2t--4 to 16 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; no effervescence; neutral; clear wavy boundary.

B3ca--16 to 18 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, sticky, slightly plastic; strong effervescence; moderately alkaline; clear wavy boundary.

Cca--18 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure to massive; soft, friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is sandy loam, fine sandy loam, or loamy sand. Reaction is neutral or mildly alkaline.

The B horizon has a color hue 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is sandy clay loam. Reaction is neutral or mildly alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is moderately or strongly alkaline.

Orella Series

The Orella series consists of shallow, well drained, very slowly permeable soils. They are located on residual uplands. They have formed in residuum from fine-textured alkaline shale. Slopes are 0 to 25 percent.

Typical pedon of Orella silty clay, 0 to 25 percent slopes, SE¼, NW¼, sec. 6, T. 47N., R. 97W., in an area of mapping unit 246.

A1--0 to 1 inch; light brownish gray (10YR 6/2) silty clay, brown (10YR 5/3) moist; weak medium platy structure parting to strong fine granular structure; slightly hard, friable, sticky, plastic; few roots; strong effervescence; strongly alkaline; gradual wavy boundary.

AC--1 to 4 inches; pale brown (10YR 6/3) clay, brown (10YR 5/3) moist; moderate medium subangular blocky structure; very hard, firm, very sticky, very plastic; few roots; strong effervescence; strongly alkaline; gradual irregular boundary.

C1--4 to 10 inches; pinkish gray (7.5YR 6/2) clay, brown (7.5YR 5/2) moist; strong medium subangular blocky structure; very hard, very firm, very sticky, very plastic; few roots; strong effervescence; very strongly alkaline; gradual irregular boundary.

C2--10 to 16 inches; pinkish gray (7.5YR 6/2) clay, brown (7.5YR 5/2) moist; massive; very hard, very firm, very sticky, very plastic; no roots; strong effervescence; very strongly alkaline; gradual wavy boundary.

Cr--16 inches; soft shale bedrock; slight effervescence; moderately alkaline.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 7.5YR through 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is silty clay or clay. Reaction is moderately or strongly alkaline.

The C horizon has a color hue of 7.5YR through 2.5Y. Texture is clay or silty clay. Reaction is strongly or very strongly alkaline.

Otero Series

The Otero series consists of deep, well drained soils with rapid permeability. They are located on alluvial fans. They have formed in sandy alluvium reworked by wind. Slopes are 3 to 15 percent.

Typical pedon of Otero sandy loam, 3 to 15 percent slopes, NE¼, sec. 17, T. 45N., R. 97W., in an area of mapping unit 346.

A1--0 to 3 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; no effervescence; mildly alkaline; clear wavy boundary.

AC--3 to 8 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; soft, friable, nonsticky, nonplastic; few thin clay films; no effervescence; mildly alkaline; clear wavy boundary.

C1ca--8 to 12 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak coarse prismatic structure; soft, very friable, nonsticky, nonplastic; slight effervescence; moderately alkaline; gradual wavy boundary.

C2ca--12 to 42 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; strong effervescence; moderately alkaline; clear wavy boundary.

C3--42 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky, nonplastic; slight effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is sandy loam, fine sandy loam, or loamy fine sand. Reaction is neutral to moderately alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Texture is sandy loam or loamy sand. Reaction is moderately or strongly alkaline.

Patent Series

The Patent series consists of deep, well drained, moderately permeable soils. They are located in bottomlands and on alluvial fans and footslopes. They have formed in alluvium derived from sedimentary rock. Slopes are 0 to 15 percent.

Typical pedon of Patent loam, 0 to 15 percent slopes, NW¼, NW¼, sec. 12, T. 45N., R. 100W., in an area of mapping unit 735.

A1--0 to 2 inches; light brownish gray (10YR 6/2) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky, slightly plastic; no effervescence; mildly alkaline; abrupt smooth boundary.

AC--2 to 8 inches; light brownish gray (10YR 6/2) loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, slightly plastic; no effervescence; mildly alkaline; clear wavy boundary.

C--8 to 60 inches; pale brown (10YR 6/3) stratified loam and very fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR, value of 5 through 7 (3 through 5 moist), and chroma of 1 through 3 dry or moist. Texture is loam.

The C horizon has a color hue of 10YR, value of 5 through 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam.

Pavillion Series

The Pavillion series consists of moderately deep, well drained, moderately permeable soils. They are located on hilly uplands. They have formed in residuum and locally transported deposits. Slopes are 0 to 20 percent.

Typical pedon of Pavillion loam, 0 to 20 percent slopes, SE¼, SW¼, sec. 28, T. 50N., R. 98W., in an area of mapping unit 371.

A--0 to 5 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium platy structure parting to weak medium granular structure; soft, very friable, nonsticky, nonplastic; many roots; slight effervescence; moderately alkaline; gradual smooth boundary.

B21--5 to 11 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure; soft, very friable, nonsticky, nonplastic; many roots; strong effervescence; moderately alkaline; gradual smooth boundary.

B22--11 to 17 inches; light brownish gray (2.5Y 6/2) loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to weak coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common roots; a few lime coatings on ped surface; violent effervescence; moderately alkaline; clear smooth boundary.

C1ca--17 to 26 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky, slightly plastic; few roots; lime coatings on ped surfaces; some gypsum crystals; violent effervescence; strongly alkaline; abrupt smooth boundary.

C2r--26 inches.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 2.5Y or 10YR, value of 6 or 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam, very fine sandy loam, clay loam, or silt loam.

The C horizon has a color hue of 2.5Y or 10YR. Texture is loam, clay loam, or silty clay loam.

Persayo Series

The Persayo series consists of shallow, well drained soils with moderately slow permeability. They are located on upland hills and ridges. They have formed in residuum from sedimentary bedrock, predominantly shale. Slopes are 3 to 45 percent.

Typical pedon of Persayo clay loam, 3 to 45 percent slopes, NW¼, SE¼, SW¼, sec. 35, T. 45N., R. 95W., in an area of mapping unit 112.

A1--0 to 3 inches; light gray (2.5Y 7/2) clay loam, grayish brown (2.5Y 5/2) moist; weak medium platy structure breaking to moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many roots; no effervescence; moderately alkaline; clear wavy boundary.

C1--3 to 9 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; gradual wavy boundary.

C2--9 to 14 inches; mixed light brownish gray and white (2.5Y 6/2 and 2.5Y 8/2) silty clay loam, mixed dark grayish brown and grayish brown (2.5Y 4/2 and 2/5Y 5/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common roots; slight effervescence; strongly alkaline; gradual wavy boundary.

Cr--14 inches; mixed light gray and olive yellow (2.5Y 7/2 and 2.5Y 6/6) silty shale with some gypsum crystals, mixed grayish brown and light olive brown (2.5Y 5/2 and 2.5Y 5/6) moist; few roots; slight effervescence; moderately alkaline.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 10 percent.

The A horizon has a color hue of 10YR through 5Y, value of 5 through 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam, loam, or silt loam. Reaction is mildly to strongly alkaline.

The C horizon has a color hue of 10YR through 5Y. Texture is silty clay loam or clay loam. Reaction is moderately or strongly alkaline.

Petrie Series

The Petrie series consists of deep, moderately well drained, slowly permeabile soils. They occur on alluvial fans, sideslopes, and in the bottoms of drainageways. They have formed in alluvium derived from strongly alkaline fine-textured sedimentary rock. Slopes are 0 to 10 percent.

Typical pedon of Petrie silty clay loam, 0 to 10 percent slopes, SE¼, SE¼, NW¼, sec. 14, T. 44N., R. 97W., in an area of mapping unit 46.

A11--0 to 2 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium platy structure breaking to moderate fine granular structure; hard, friable, sticky, plastic; vesicular pores; slight effervescence; moderately alkaline; gradual wavy boundary.

A12--2 to 7 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse platy structure breaking to weak medium subangular blocky structure; hard, friable, sticky, plastic; slight effervescence; strongly aklaline; gradual wavy boundary.

C1cs--7 to 42 inches; grayish brown with white gypsum deposits (2.5Y 5/2 with 2.5Y 8/2) silty clay, dark grayish brown with light gray gypsum deposits (2.5Y 4/2 with 2.5Y 7/2) moist; massive; hard, friable, sticky, plastic; slight effervescence; moderately alkaline; wavy boundary.

C2cs--42 to 60 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky, plastic; slight effervescence; strongly alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 through 5 moist), and chroma of 1 through 3 dry or moist. Texture is silty clay loam, clay loam, or clay. Reaction is moderately or strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Texture is clay or silty clay. Reaction is strongly or very strongly alkaline.

Pinelli Series

The Pinelli series consists of deep, well drained, moderately slowly permeable soils. They occur on alluvial fans, lower sideslopes, and valley floors. They have formed in mixed alluvium derived from sedimentary bedrock. Slopes are 3 to 15 percent.

Typical pedon of Pinelli loam, 3 to 15 percent slopes, SE¼, SE¼, sec. 14, T. 45N., R. 100W., in an area of mapping unit 736.

A1--0 to 3 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure parting to weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many roots; no effervescence; mildly alkaline; abrupt smooth boundary.

B21t--3 to 10 inches; pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine angular blocky structure; slightly hard, friable, sticky, plastic; common roots; no effervescence; mildly alkaline; abrupt smooth boundary.

B22t--10 to 19 inches; brown (10YR 5/3) silty clay loam, dark yellowish brown (10YR 3/4) moist; weak fine prismatic structure parting to strong fine angular blocky structure; hard, firm, very sticky, very plastic; common roots; slight effervescence; mildly alkaline; clear wavy boundary.

B23tca--19 to 31 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; hard, firm, very sticky, very plastic; common roots; strong effervescence; moderately alkaline; clear wavy boundary.

C--31 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (7.5YR 4/4) moist; massive; slight effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 7.5YR through 2.5Y, value of 5 through 7 (3 through 5 moist), and chroma of 2 to 3 dry or moist. Texture is loam or clay loam.

The B horizon has a color hue of 7.5YR or 10YR, value of 5 through 7 (3 through 5 moist), and chroma of 3 or 4 dry or moist. Texture is clay loam or silty clay loam.

The C horizon has a color hue of 7.5YR or 10YR. Texture is silty clay loam or silt loam.

Preatorson Series

The Preatorson series consists of deep, well drained soils with moderately rapid permeability. They occur on alluvial fans, pediment slopes, and terraces. They have formed in gravelly alluvium. Slopes are 0 to 10 percent.

Typical pedon of Preatorson very gravelly loam, 0 to 10 percent slopes, NE¼, NE¼, sec. 27, T. 51N., R. 98W., in an area of mapping unit 11T.

A1--0 to 3 inches; light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, friable, nonsticky, nonplastic; no effervescence; mildly alkaline; clear wavy boundary.

B21t--3 to 7 inches; grayish brown (10YR 5/2) very gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky, plastic; 35 percent gravel; no effervescence; mildly alkaline; gradual wavy boundary.

B3ca--7 to 10 inches; light gray (10YR 7/2) very gravelly sandy clay loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; 50 percent gravel; gravel and cobbles are lime coated; strong effervescence; moderately alkaline.

C1ca--10 to 30 inches; light gray (10YR 7/2) very gravelly sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky, nonplastic; 60 percent gravel and cobbles; strong effervescence; strongly alkaline; gradual wavy boundary.

C2--30 to 60 inches; light brownish gray (10YR 6/2) very gravelly sand, grayish brown (10YR 5/2) moist; massive; loose, nonsticky, nonplastic; 60 percent gravel and cobbles; slight effervescence; moderately alkaline.

Depth to sand and gravel substratum ranges from 10 to 20 inches. Content of coarse fragments ranges from 35 to 60 percent above the sand and gravel substratum.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 or 3 dry or moist. Texture is very gravelly loam, gravelly clay loam, or gravelly sandy clay loam. Reaction is mildly or moderately alkaline.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is very gravelly clay loam or very gravelly sandy clay loam. Reaction is mildly or moderately alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Texture is very gravelly sandy loam to very gravelly sand. Reaction is moderately or strongly alkaline.

Rekop Series

The Rekop series consists of shallow, somewhat excessively drained, moderately permeable soils. They are located on upland ridges and sideslopes. They have formed in residuum and locally transported sediment derived from gypsiferous sedimentary bedrock. Slopes are 3 to 60 percent.

Typical pedon of Rekop loam, 3 to 60 percent slopes, SE¼, NW¼, NE¼, sec. 27, T. 43N., R. 95W., in an area of mapping unit 445.

A--0 to 4 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) moist; weak medium platy structure breaking to moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many roots; slight effervescence; moderately alkaline; gradual irregular boundary.

Ccs--4 to 10 inches; pink with pinkish white gypsum deposits (7.5YR 7/4 with 7.5YR 8/2) silty clay loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common roots; strong effervescence; moderately alkaline; clear wavy boundary.

Crcs--10 inches; soft gypsiferous bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 5YR through 10YR, value of 5 through 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam, very fine sandy loam or silt loam.

The C horizon has a color hue of 5YR or 7.5YR. Texture is silty clay loam, silt loam, or loam.

Renohill Series

The Renohill series consists of deep, well drained, slowly permeable soils. They are located on upland hills, ridges, and benches. They have formed in residuum from sedimentary rock, predominantly shale. Slopes are 0 to 20 percent.

Typical pedon of Renohill clay loam, 3 to 20 percent slopes, NE¼, NW¼, SE¼, sec. 1, T. 47N., R. 98W., in an area of mapping unit 708.

A1--0 to 2 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak coarse platy structure breaking to strong fine granular structure; soft, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; clear wavy boundary.

B1--2 to 4 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist: weak medium platy structure breaking to moderate medium subangular blocky structure; hard, friable, sticky, plastic; no effervescence; mildly alkaline; gradual wavy boundary.

B21t--4 to 10 inches; yellowish brown (10YR 5/4) clay, brown (10YR 4/3) moist; moderate coarse prismatic structure; very hard, firm, very sticky, very plastic; no effervescence; mildly alkaline; gradual wavy boundary.

B22t--10 to 16 inches; pale brown (10YR 6/3) clay, yellowish brown (10YR 5/4) moist; moderate coarse prismatic structure; very hard, firm, very sticky, very plastic; no effervescence; mildly alkaline; gradual irregular boundary.

Cca--16 to 24 inches; light yellowish brown with white lime coatings (10YR 6/4 with 10YR 8/2) sandy clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky, slightly plastic; violent effervescence; moderately alkaline; gradual wavy boundary.

Cr--24 inches; strongly alkaline soft shale bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is clay loam or loam. Reaction is neutral or mildly alkaline.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay or clay loam. Reaction is neutral to moderately alkaline.

The C horizon has a color hue of 2.5Y or 10YR. Reaction is moderately or strongly alkaline.

Saddle Series

The Saddle series consists of moderately deep, well drained, moderately permeable soils. They are located on upland benches, hills, and ridges. They have formed in residuum and alluvial and eolian sediments derived from interbedded sandstone and shale. Slopes are 0 to 15 percent.

Typical pedon of Saddle fine sandy loam, 0 to 15 percent slopes, NE¼, NE¼, sec. 21, T. 49N., R. 98W., in an area of mapping unit 394.

A1--0 to 3 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; moderate medium platy structure; soft, friable, nonsticky, nonplastic; no effervescence; mildly alkaline; clear smooth boundary.

B21t--3 to 7 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; moderate coarse prismatic structure; hard, friable, slightly sticky, slightly plastic; continuous clay films; no effervescence; mildly alkaline; gradual wavy boundary.

B22t--7 to 10 inches; pale brown (10YR 6/3) sandy clay loam, yellowish brown (10YR 5/4) moist; moderate coarse prismatic structure; hard, friable, slightly sticky, slightly plastic; continuous clay films; no effervescence; mildly alkaline; gradual wavy boundary.

B3ca--10 to 16 inches; pale brown with white lime nodules (10YR 6/3 and 10YR 8/2) sandy clay loam, brown (10YR 5/3) moist; weak coarse prismatic structure; hard, friable, slightly sticky, slightly plastic; threads and seams of lime; violent effervescence; moderately alkaline; gradual wavy boundary.

C1ca--16 to 24 inches; pale brown with white lime nodules (10YR 6/3 and 10YR 8/2) clay loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; violent effervescence; strongly alkaline; clear wavy boundary.

C2--24 to 30 inches; light gray (10YR 7/2) sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; strong effervescence; strongly alkaline; abrupt wavy boundary.

Cr--30 inches; sandstone bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 1 through 3 dry or moist. Texture is fine sandy loam or sandy loam.

Saddle Series--Continued

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is sandy clay loam or clay loam.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is moderately or strongly alkaline.

Samsil Series

The Samsil series consists of shallow, well drained, slowly or very slowly permeable soils. They are located on residual uplands. They have formed in residuum from shale. Slopes are 3 to 45 percent.

Typical pedon of Samsil clay, 3 to 45 percent slopes, center, E½, sec. 31, T. 43N., R. 95W., in an area of mapping unit 753.

A--0 to 1 inch; grayish brown (10YR 5/2) clay, brown (10YR 4/3) moist; strong fine granular structure; slightly hard, firm, very sticky, very plastic; slight effervescence; moderately alkaline; abrupt smooth boundary.

C1--1 to 9 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; strong fine and medium prismatic structure; extremely hard, extremely firm, very sticky, very plastic; slight effervescence; moderately alkaline; clear wavy boundary.

C2--9 to 16 inches; brown (10YR 5/3) clay, dark grayish brown (10YR 4/2) moist; strong fine and medium prismatic structure; extremely hard, extremely firm, very sticky, very plastic; slight effervescence; moderately alkaline; clear wavy boundary.

Cr--16 inches; soft platy shale bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 35 percent.

The A horizon has a color hue of 10YR through 5Y, value of 5 through 7 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay or silty clay.

The C horizon has a color hue of 10YR through 5Y, value of 4 through 6 (2 through 4 moist), and chroma of 0 through 3 dry or moist. Texture is clay or silty clay.

Shingle Series

The Shingle series consists of shallow, well drained, moderately permeable soils. They are located on residual uplands. They have formed in residuum and slope wash derived from interbedded sandstone and shale. Slopes are 3 to 60 percent.

Typical pedon of Shingle loam, 3 to 60 percent slopes, SW¼, sec. 30, T. 44N., R. 96W., in an area of mapping unit 490.

A1--0 to 4 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft very friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline; clear wavy boundary.

C--4 to 11 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky, plastic; strong effervescence; moderately alkaline; clear wavy boundary.

Cr--11 inches; soft shale bedrock.

Depth to bedrock ranges from 4 to 20 inches. Content of coarse fragments ranges from 0 to 5 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is loam, silty clay loam, or clay loam. Reaction is mildly to strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is moderately or strongly alkaline.

Spearfish Series

The Spearfish series consists of shallow, well drained, moderately permeable soils. They are located on residual uplands. They have formed in residuum from red siltstone. Slopes are 3 to 40 percent.

Typical pedon of Spearfish very fine sandy loam, 3 to 40 percent slopes, SE¼, NE¼, sec. 2, T. 43N., R. 96W., in an area of mapping unit 446.

A11--0 to 2 inches; reddish brown (5YR 5/4) very fine sandy loam, reddish brown (5YR 4/4) moist; moderate thin platy structure; loose, very friable, nonsticky, nonplastic; many roots; moderately alkaline; abrupt smooth boundary.

A12--2 to 9 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; soft, friable, nonsticky, nonplastic; many roots; mildly alkaline; abrupt smooth boundary.

C--9 to 16 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; platy structure; hard, friable, nonsticky, nonplastic; few roots; mildly alkaline; abrupt wavy boundary.

Cr--16 inches; red siltstone.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 20 percent.

The A horizon has a color hue of 5YR or 2.5YR, value of 4 through 6 (3 or 4 moist), and chroma of 2 through 4 dry or moist. Texture is very fine sandy loam, loam, or silt loam. Reaction is neutral to moderately alkaline.

The C horizon has a color hue of 2.5YR through 5.5YR, value of 5 or 6 (3 through 5 moist), and chroma of 4 through 6 dry or moist. Texture is loam or silt loam. Reaction is mildly or moderately alkaline.

Starley Series

The Starley series consists of shallow, well drained, moderately permeable soils. They are located on mountain sideslopes and ridges. They have formed in thin, gravelly residuum derived from limestone. Slopes are 6 to 40 percent.

Typical pedon of Starley loam, 6 to 40 percent slopes, NW¼, NE¼, sec. 29, T. 43N., R. 101W., in an area of mapping unit 806.

A1--0 to 8 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; many roots; no effervescence; mildly alkaline; abrupt smooth boundary.

Cca--8 to 19 inches; light gray (10YR 7/2) very gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; few roots; strong effervescence; moderately alkaline; abrupt wavy boundary.

R--19 inches; limestone bedrock.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 35 to 70 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is loam, gravelly loam, or stony loam. Reaction is neutral to moderately alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Texture is very gravelly loam or very gravelly clay loam. Reaction is moderately to strongly alkaline.

Starman Series

The Starman series consists of shallow, well drained, moderately permeable soils. They are located on hills, ridges, and mountain sideslopes. They have formed in residuum from hard, calcareous sedimentary bedrock. Slopes are 6 to 60 percent.

Typical pedon of Starman gravelly loam, 6 to 60 percent slopes, SE¼, SE¼, SW¼, sec. 21, T. 43N., R. 101W., in an area of mapping unit 806.

A--0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; slight effervescence; mildly alkaline; clear wavy boundary.

Cca--3 to 9 inches; light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; strong effervescence; mildly alkaline; abrupt wavy boundary.

R--9 inches; limestone bedrock.

Depth to bedrock ranges from 4 to 10 inches. Content of coarse fragments ranges from 35 to 60 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (2 through 4 moist), and chroma of 2 or 3 dry or moist. Texture is gravelly loam, loam, or silt loam. Reaction is mildly or moderately alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is mildly to strongly alkaline.

Stoneham Series

The Stoneham series consists of deep, well drained, moderately permeable soils. They are located on alluvial fans. They have formed in alluvium from sedimentary rock. Slopes are 2 to 15 percent.

Typical pedon of Stoneham loam, 3 to 15 percent slopes, center, sec. 32, T. 46N., R. 98W., in an area of mapping unit 700.

A1--0 to 3 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak medium platy structure breaking to moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; clear smooth boundary.

B21t--3 to 7 inches; light brownish gray (10YR 6/2) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure; hard, friable, slightly sticky, plastic; no effervescence; mildly alkaline; gradual wavy boundary.

B22t--7 to 9 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure; hard, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; gradual wavy boundary.

B3ca--9 to 13 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; slight effervescence; moderately alkaline; gradual wavy boundary.

C1ca--13 to 24 inches; pale brown with light gray lime seams (10YR 6/3 and 10YR 7/2) sandy clay loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; strong effervescence; moderately alkaline; gradual wavy boundary.

C2--24 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; violent effervescence; moderately alkaline.

Depth to bedrock ranges from 40 to 60 inches or more. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3 dry or moist. Texture is loam, silt loam, or very fine sandy loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam or sandy clay loam.

The C horizon has a color hue of 10YR or 2.5Y.

Tassel Series

The Tassel series consists of shallow, well drained soils with moderately rapid permeablility. They are located on residual uplands usually on crests and shoulders of hills and ridges. They have formed in residuum from soft sandstone. Slopes are 3 to 45 percent.

Typical pedon of Tassel sandy loam, 3 to 45 percent slopes, NW¼, sec. 18, T. 45N., R. 96W., in an area of mapping unit 383.

A1--0 to 3 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable, nonsticky, slightly plastic; strong effervescence; moderately alkaline; gradual wavy boundary.

C1--3 to 15 inches; light gray (10YR 7/2) sandy loam, grayish brown (10YR 5/2) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky, slightly plastic; strong effervescence; moderately alkaline; gradual wavy boundary.

C2ca--15 to 18 inches; very pale brown (10YR 7/3) sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky, nonplastic; violent effervescence; moderately alkaline; abrupt wavy boundary.

Cr--18 inches; soft sandstone; violent effervescence.

Depth to bedrock ranges from 10 to 20 inches.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is sandy loam, fine sandy loam, or loamy sand. Reaction is mildly or moderately alkaline.

The C horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Reaction is mildly or moderately alkaline.

Tensleep Series

The Tensleep series consists of deep, well drained, moderately permeable soils. They are located on alluvial fans and uplands. They have formed in alluvium and residuum from reddish sedimentary rock. Slopes are 0 to 8 percent.

Typical pedon of Tensleep very fine sandy loam, 0 to 8 percent slopes, SE¼, SE¼, sec. 12, T. 42N., R. 96W., in an area of mapping unit 373.

A1--0 to 4 inches; brown (7.5YR 5/4) very fine sandy loam, dark reddish brown (5YR 3/4) moist; moderate thin platy structure parting to moderate fine granular structure; soft, very friable, nonsticky, slightly plastic; many roots; no effervescence; neutral; abrupt smooth boundary.

B2t--4 to 14 inches; brown (7.5YR 5/4) silt loam, dark reddish brown (5YR 3/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky structure; hard, very friable, slightly sticky, plastic; common roots; no effervescence; mildly alkaline; clear wavy boundary.

B3tca--14 to 19 inches; light brown (7.5YR 6/4) silt loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, very friable, sticky, plastic; common roots; strong effervescence; moderately alkaline; clear wavy boundary.

C1ca--19 to 30 inches; light brown (7.5YR 6/4) silt loam, reddish brown (5YR 5/3) moist; moderate medium subangular blocky structure; hard, very friable, sticky, plastic; strong effervescence; strongly alkaline; clear wavy boundary.

C2--30 to 60 inches; light brown (7.5YR 6/4) silt loam, brown (7.5YR 5/4) moist; massive, slightly hard, very friable, nonsticky, nonplastic; few roots; strong effervescence; strongly alkaline.

Depth to bedrock ranges from 40 to 60 inches or more. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 7.5YR through 2.5YR, value of 4 through 6 (3 or 4 moist), and chroma of 3 through 6 dry or moist. Texture is very fine sandy loam, loam, or silt loam.

The B horizon has a color hue of 7.5YR through 2.5YR, value of 5 or 6 (3 through 5 moist), and chroma of 3 through 6 dry or moist. Texture is silt loam or silty clay loam.

The C horizon has a color hue of 7.5YR through 2.5YR. Reaction is moderately or strongly alkaline.

Terry Series

The Terry series consists of moderately deep, well drained soils with moderately rapid permeability. They are located on upland hills and ridges. They have formed in residuum from sandstone. Slopes are 3 to 20 percent.

Typical pedon of Terry sandy loam, 3 to 20 percent slopes, NW¼, sec. 17, T. 45N., R. 96W., in an area of mapping unit 346.

A1--0 to 3 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; no effervescence; neutral; clear smooth boundary.

B21t--3 to 12 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; clear wavy boundary.

B22t--12 to 18 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; clear wavy boundary.

Cca--18 to 30 inches; light gray (2.5Y 7/2) fine sandy loam, mixed grayish brown and brown (10YR 5/2 and 10YR 4/3) moist; massive; soft, very friable, nonsticky, nonplastic; strong effervescence; moderately alkaline; abrupt wavy boundary.

Cr--30 inches; soft calcareous sandstone, light brownish gray (10YR 6/2) moist; strong effervescence; moderately alkaline.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 or 4 moist), and chroma of 1 through 3 dry or moist. Texture is sandy loam, fine sandy loam, or loamy fine sand.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is sandy loam or fine sandy loam.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is moderately or strongly alkaline.

Thedalund Series

The Thedalund series consists of moderately deep, well drained, moderately permeable soils. They are located on alluvial fans and in basins. They have formed in alluvium derived from sedimentary rock. Slopes are 0 to 20 percent.

Typical pedon of Thedalund loam, 0 to 20 percent slopes, SW¼, sec. 30, T. 44N., R. 96W., in an area of mapping unit 490.

A1--0 to 3 inches; pale brown (10YR 6/3) loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, plastic; many roots; strong effervescence; moderately alkaline; clear smooth boundary.

AC--3 to 8 inches; pale brown (10YR 6/3) loam, olive brown (2.5Y 4/4) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many roots; strong effervescence; moderately alkaline; clear smooth boundary.

C1--8 to 28 inches; pale brown (10YR 6/3) loam, light olive brown (2.5Y 5/4) moist; massive; soft, very friable, slightly sticky, slightly plastic; few roots; strong effervescence; moderately alkaline; clear wavy boundary.

C2r--28 to 34 inches; calcareous thin platy shale; no roots; strong effervescence; moderately alkaline; clear wavy boundary.

C3r--34 inches; shale bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is loam, silt loam, or very fine sandy loam.

The C horizon has a color hue of 10YR or 2.5Y. Texture is silty clay loam, clay loam, silt loam, or loam.

Thermopolis Series

The Thermopolis series consists of shallow, well drained, moderately permeable soils. They are located on upland hills and ridges. They have formed in residuum from reddish sedimentary rock. Slopes are 3 to 45 percent.

Typical pedon of Thermopolis loam, 3 to 45 percent slopes, NE¼, SW¼, SW¼, sec. 16, T. 46N., R. 100W., in an area of mapping unit 732.

A1--0 to 4 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) moist; weak fine granular structure; soft, very friable, sticky, plastic; many roots; weak effervescence; mildly alkaline; clear smooth boundary.

C--4 to 10 inches; light reddish brown (5YR 6/4) loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; soft, friable, sticky, plastic; many roots; strong effervescence; moderately alkaline; abrupt wavy boundary.

Cr--10 inches; reddish siltstone.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 35 percent.

The A horizon has a color hue of 7.5YR through 2.5YR, value of 5 or 6 (3 or 4 moist), and chroma of 3 through 6 dry or moist. Texture is loam, silt loam, or silty clay loam.

The C horizon has a color hue of 7.5YR through 2.5YR.

Travessilla Series

The Travessilla series consists of shallow, well drained soils with moderately permeability. They are located on sandstone-dominated uplands. They have formed in residuum from sandstone. Slopes are 3 to 60 percent.

Typical pedon of Travessilla stony loam, thick surface, 3 to 60 percent slopes, NW¼, NE¼, SW¼, sec. 27, T. 43N., R. 95W., in an area of mapping unit 447.

A1--0 to 3 inches; pale brown (10YR 6/3) stony loam, brown (10YR 4/3) moist; weak thin platy structure parting to moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many roots, strong effervescence; moderately alkaline; gradual wavy boundary.

AC--3 to 8 inches; pale brown (10YR 6/3) stony loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common roots; strong effervescence; moderately alkaline; gradual wavy boundary.

C1ca--8 to 12 inches; very pale brown (10YR 7/3) stony loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky, nonplastic; common roots; strong effervescence; moderately alkaline; gradual wavy boundary.

C2ca--12 to 16 inches; light gray (10YR 7/2) stony loam, brown (10YR 5/3) moist; massive, with white carbonate coatings; soft, very friable, nonsticky, nonplastic; few roots; violent effervescence; moderately alkaline; clear wavy boundary.

R--16 inches; hard fractured sandstone.

Depth to bedrock ranges from 6 to 20 inches. Content of coarse fragments ranges from 0 to 35 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is stony loam, very fine sandy loam, or silt loam.

The C horizon has a color hue of 10YR or 2.5Y.

Uffens Series

The Uffens series consists of deep, well drained, moderately slowly permeable soils. They are located in bottomlands and on alluvial fans and terraces. They have formed in alluvium derived from mixed sedimentary rocks. Slopes are 0 to 6 percent.

Typical pedon of Uffens very fine sandy loam, 0 to 6 percent slopes, center, SW¼, sec. 29, T. 47N., R. 97W., in an area of mapping unit 601.

A2--0 to 3 inches; light gray (10YR 7/2) very fine sandy loam, grayish brown (10YR 5/2) moist; moderate medium platy structure; slightly hard, very friable, nonsticky, nonplastic; no effervescence; strongly alkaline; clear smooth boundary.

B2t--3 to 7 inches; light yellowish brown (10YR 6/4) sandy clay loam, brown (10YR 5/3) moist; moderate medium columnar structure; very hard, firm, sticky, plastic; slight effervescence; very strongly alkaline; gradual wavy boundary.

B3tca--7 to 13 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; strong effervescence; very strongly alkaline; gradual wavy boundary.

C1--13 to 22 inches; pale brown (10YR 6/3) fine sandy loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure parting to weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; strong effervescence; very strongly alkaline; gradual wavy boundary.

C2--22 to 34 inches; pale brown (10YR 6/3) loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; slight effervescence; clear wavy boundary.

C3--34 to 44 inches; very pale brown (10YR 7/3) fine sandy loam, light yellowish brown (10YR 6/4) moist; massive; soft, friable, nonsticky, nonplastic; slight effervescence; very strongly alkaline; clear wavy boundary.

C4--44 to 54 inches; very pale brown (10YR 7/3) loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; slight effervescence; strongly alkaline; clear wavy boundary.

C5--54 to 60 inches; very pale brown (10YR 7/3) sandy loam, light yellowish brown (10YR 6/4) moist; massive; soft, friable, nonsticky, nonplastic; slight effervescence; strongly alkaline.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is very fine sandy loam, loam, silt loam, or clay loam.

Uffens Series--Continued

The B horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam or sandy clay loam. Reaction is strongly or very strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is moderately to very strongly alkaline.

Ulm Series

The Ulm series consists of deep, well drained soils with moderately slow to slow permeability. They are located on alluvial fans gently sloping valley sideslopes. They have formed in alluvium derived from sedimentary rock. Slopes are 0 to 10 percent.

Typical pedon of Ulm loam, 3 to 10 percent slopes, SE¼, SW¼, NE¼, sec. 32, T. 46N., R. 98W., in an area of mapping unit 73.

A11--0 to 2 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine platy structure; soft, friable, slightly sticky, slightly plastic; no effervescence; neutral; gradual smooth boundary.

A12--2 to 5 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium platy structure breaking to weak fine granular structure; soft, friable, slightly sticky, slightly plastic; no effervescence; mildly alkaline; clear smooth boundary.

B21t--5 to 10 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (10YR 4/2) moist; strong medium prismatic structure; very hard, firm, sticky, plastic; no effervescence; mildly alkaline; gradual smooth boundary.

B22t--10 to 14 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure; very hard, firm, sticky, plastic; no effervescence; moderately alkaline; gradual smooth boundary.

B3ca--14 to 22 inches; light brownish gray (2.5Y 6/2) clay loam, brown (10YR 5/3) moist; weak medium prismatic structure; very hard, firm, sticky, plastic; strong effervescence; moderately alkaline; gradual smooth boundary.

Cca--22 to 60 inches; light brownish gray with light gray lime coating on ped surfaces (2.5Y 6/2 and 2.5Y 7/2) sandy clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; violent effervescence; strongly alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (3 through 5 moist), and chroma of 1 through 3 dry or moist. Texture is loam, silt loam, or silty clay loam. Reaction is neutral or mildly alkaline.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay or clay loam. Reaction is neutral to moderately alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is moderately or strongly alkaline.

Vona Series

The Vona series consists of deep, well drained soils with moderately rapid permeability. They are located on rolling uplands. They have formed in alluvial and eolian sediments. Slope ranges from 0 to 12 percent.

Typical pedon of Vona sandy loam, 0 to 10 percent slopes, NW¼, T. 45N., R. 97W., in an area of mapping unit 93.

A1--0 to 4 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; no effervescence; neutral; clear smooth boundary.

B21t--4 to 7 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; no effervescence; neutral; clear wavy boundary.

B22t--7 to 16 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; no effervescence; neutral; clear wavy boundary.

B3--16 to 19 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky, nonplastic; no effervescence; neutral; clear wavy boundary.

Cca--19 to 60 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; strong effervescence; moderately alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is sandy loam, fine sandy loam, or loamy fine sand.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is sandy loam.

The C horizon has a color hue of 10YR or 2.5Y, value of 6 through 8 (5 through 7 moist), and chroma of 2 through 4 dry or moist. Texture is sandy loam or loamy sand.

Wetterhorn Series

The Wetterhorn series consists of moderately deep, well drained, slowly permeable soils. They are located on mountain sideslopes. They have formed in residuum from sedimentary bedrock. Slopes are 6 to 60 percent.

Typical pedon of Wetterhorn stony loam, 6 to 60 percent slopes, NW¼, NE¼, SW¼, sec. 21, T. 45N., R. 101W., in an area of mapping unit 876.

A1--0 to 1 inch; dark grayish brown (10YR 4/2) stony loam, black (10YR 2/1) moist; weak thin platy structure; soft, very friable, nonsticky, nonplastic; no effervescence; neutral; abrupt smooth boundary.

A21--1 to 5 inches; light brownish gray (10YR 6/2) stony loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, friable, nonsticky, slightly plastic; no effervescence; neutral; clear smooth boundary.

A22--5 to 9 inches; light brownish gray (10YR 6/2) stony clay loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, firm, sticky, plastic; no effervescence; neutral; clear smooth boundary.

B2t--9 to 16 inches; grayish brown (10YR 5/2) stony clay loam, brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, firm, very sticky, very plastic; no effervescence; neutral; clear smooth boundary.

B3--16 to 24 inches; brown (10YR 5/3) stony clay loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; hard, firm, very sticky, very plastic; no effervescence; neutral; clear smooth boundary.

R--24 inches; sandstone bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 15 to 35 percent.

The A2 horizon has a color hue of 10YR or 7.5YR, value of 5 through 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is stony loam or stony clay loam.

The B horizon has a color hue of 10YR or 7.5YR, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is stony clay loam or stony clay.

Wetterhorn Variant

The Wetterhorn Variant consists of moderately deep, well drained, slowly permeable soils. They occur on high mountain sideslopes and ridges. They have formed in residuum from sedimentary bedrock. Slopes are 6 to 60 percent.

Typical pedon of Wetterhorn Variant very stony loam, 6 to 60 percent slopes, SW¼, SW¼, sec. 21, T. 45N., R. 101W., in an area of mapping unit 876.

O2--1 to 0 inch; duff layer.

A2--0 to 1½ inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; soft, very friable, nonsticky, nonplastic; no effervescence; neutral; abrupt smooth boundary.

B1--1½ to 6 inches; grayish brown (10YR 5/2) very stony clay loam, very dark grayish brown (10YR 3/2) moist; strong fine angular blocky structure; hard, firm, sticky, plastic; no effervescence; slightly acid; clear wavy boundary.

B2t--6 to 14 inches; light brownish gray (10YR 6/2) very stony clay, dark brown (10YR 3/3) moist; strong fine and medium angular blocky structure; very hard, extremely firm, very sticky, very plastic; no effervescence; neutral; clear wavy boundary.

B3--14 to 32 inches; grayish brown (10YR 5/2) very stony clay, brown (10YR 4/3) moist; strong fine and medium angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; no effervescence; neutral; abrupt wavy boundary.

R--32 inches; weathered bedrock.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 35 to 60 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is stony loam or stony clay loam. Reaction is neutral to slightly acid.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 through 4 dry or moist. Texture is stony silty clay or stony clay. Reaction is neutral to slightly acid.

Wix Series

The Wix series consists of moderately deep, well drained, moderately permeable soils. They are located on mountain sideslopes and toeslopes. They have formed in residuum and alluvium derived from igneous bedrock. Slopes are 3 to 45 percent.

Typical pedon of Wix very fine sandy loam, 6 to 45 percent slopes, SE¼, SE¼, NE¼, sec. 25, T. 44N., R. 102W., in an area of mapping unit 870.

O--1 to 0 inch; forest litter, needles and twigs.

A1--0 to 4 inches; dark gray (10YR 4/1) very fine sandy loam, black (10YR 2/1) moist; moderate medium platy structure breaking to moderate fine granular structure; soft, friable, nonsticky, nonplastic; no effervescence; neutral; clear wavy boundary.

A2--4 to 10 inches; light gray (10YR 7/2) fine sandy loam, grayish brown (10YR 5/2) moist; weak medium and fine subangular blocky structure; soft, friable, nonsticky, nonplastic; no effervescence; neutral; gradual irregular boundary.

B2t--10 to 26 inches; mixed light brownish gray and grayish brown (10YR 6/2 and 10YR 5/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, sticky, plastic; no effervescence; neutral; gradual wavy boundary.

B3--26 to 30 inches; mixed light brownish gray and grayish brown (10YR 6/2 and 10YR 5/2) gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; weak medium and subangular blocky structure; very hard, firm, sticky, plastic; no effervescence; neutral; abrupt wavy boundary.

Cr--30 inches; weathered rhyolite.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent in the A and B2t horizons.

The A1 horizon has a color hue of 10YR or 2.5Y, value of 4 or 5 (2 or 3 moist), and chroma of 1 through 3 dry or moist. Texture is very fine sandy loam or loam.

The A2 horizon has a color hue of 10YR or 2.5Y, value of 6 through 8 (4 through 7 moist), and chroma of 2 through 4 dry or moist.

The B horizon has a color hue of 10YR or 2.5Y, value of 4 through 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is sandy clay loam, clay loam, or gravelly sandy clay loam.

Worf Series

The Worf series consists of shallow, well drained, moderately permeable soils. They are located on upland hills, benches, and ridges. They have formed in residuum from sedimentary rock. Slopes are 0 to 20 percent.

Typical pedon of Worf loam, 0 to 15 percent slopes, NE¼, NW¼, NE¼, sec. 12, T. 47N., R. 47W., in an area of mapping unit 410.

A1--0 to 3 inches; pale brown (10YR 6/3) loam, moderate medium platy structure breaking to moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many roots; no effervescence; moderately alkaline; clear smooth boundary.

B21t--3 to 6 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many roots; no effervescence; mildly alkaline; clear wavy boundary.

B22t--6 to 10 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common roots; no effervescence; mildly alkaline; gradual wavy boundary.

Cca--10 to 14 inches; very pale brown (10YR 7/3) channery sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, nonsticky, slightly plastic; few roots; violent effervescence; moderately alkaline; abrupt wavy boundary.

Cr--14 inches; soft, calcareous sandstone.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 or 4 moist), and chroma of 2 or 3 dry or moist. Texture is loam, clay loam, or silt loam.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 through 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam or loam.

The C horizon has a color hue of 10YR or 2.5Y.

Worfka Series

The Worfka series consists of shallow, well drained, permeable soils. They are located on residual uplands. They have formed in residuum weathered from sedimentary rock. Slopes are 0 to 20 percent.

Typical pedon of Worfka loam, 3 to 20 percent slopes, center sec. 8, T. 47N., R. 97W., in an area of mapping unit 751.

A1--0 to 3 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium platy structure parting to strong fine granular structure; soft, very friable, nonsticky, nonplastic; many roots; no effervescence; mildly alkaline; clear wavy boundary.

B2t--3 to 7 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky structure; hard, friable, sticky, plastic; many roots; no effervescence; moderately alkaline; clear irregular boundary.

B3ca--7 to 14 inches; brown with white lime coatings (10YR 5/3 and 10YR 8/2) clay loam, mixed yellowish brown and pale brown (10YR 5/4 and 10YR 6/3) moist; moderate medium prismatic structure parting to weak medium subangular blocky structure; hard, friable, sticky, plastic; many roots; strong effervescence; strongly alkaline; gradual irregular boundary.

Cca--14 to 18 inches; very pale brown (10YR 7/3 and 10YR 8/3) sandy clay loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common roots; violent effervescence; strongly alkaline; gradual wavy boundary.

Cr--18 inches; calcareous sandstone bedrock; violent effervescence; gradual wavy boundary.

Depth to bedrock ranges from 10 to 20 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (3 through 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam or clay loam. Reaction is neutral to moderately alkaline.

The B horizon has a color hue of 10YR or 2.5Y, value of 5 or 6 (4 or 5 moist), and chroma of 2 through 4 dry or moist. Texture is clay loam. Reaction is mildly or moderately alkaline.

The C horizon has a color hue of 10YR or 2.5Y. Reaction is moderately or strongly alkaline.

Worland Series

The Worland series consists of moderately deep, well drained soils with moderately rapid permeability. They are located on residual uplands. They have formed in residuum from calcareous sandstone. Slopes are 3 to 15 percent.

Typical pedon of Worland sandy loam, 3 to 15 percent slopes, NW¼, NE¼, sec. 12, T. 44N., R. 95W., in an area of mapping unit 572.

A1--0 to 4 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak medium and coarse platy structure; soft, very friable, nonsticky, nonplastic; many roots; no effervescence; mildly alkaline; clear wavy boundary.

AC--4 to 8 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky, nonplastic; many roots; no effervescence; mildly alkaline; gradual wavy boundary.

C1--8 to 14 inches; light brownish gray (2.5Y 6/2) sandy loam, grayish brown (2.5Y 5/2) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky, nonplastic; common roots; slight effervescence; moderately alkaline; gradual wavy boundary.

C2--14 to 22 inches; mixed light gray and white (2.5Y 7/2 and 2.5Y 8/2) sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few roots; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr--22 inches; light gray (2.5Y 7/2) soft calcareous sandstone, light brownish gray (2.5Y 6/2) moist.

Depth to bedrock ranges from 20 to 40 inches. Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 5 through 7 (4 through 6 moist), and chroma of 2 or 3 dry or moist. Texture is sandy loam or fine sandy loam.

The C horizon has a color hue of 10YR or 2.5Y. Texture is sandy loam.

Youngston Series

The Youngston series consists of deep, well drained, moderately permeable soils. They are located in bottomlands and on alluvial fans. They have formed in alluvium derived predominantly from medium and moderately fine-textured sedimentary rock. Slopes are 0 to 10 percent.

Typical pedon of Youngston loam, 0 to 6 percent slopes, NE¼, NE¼, sec. 7, T. 50N., R. 98W., in an area of mapping unit 45.

A1--0 to 3 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; moderate medium platy structure breaking to weak fine granular structure; soft, very friable, nonsticky, nonplastic; slight effervescence; moderately alkaline; clear smooth boundary.

AC--3 to 11 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak coarse prismatic structure breaking to weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; slight effervescence; moderately alkaline; gradual smooth boundary.

C1--11 to 22 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; violent effervescence; moderately alkaline; gradual smooth boundary.

C2--22 to 33 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; slight effervescence; strongly alkaline; gradual smooth boundary.

C3--33 to 60 inches; very pale brown (10YR 7/3) silt loam with their lenses of fine sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky, slightly plastic; strong effervescence; strongly alkaline.

Content of coarse fragments ranges from 0 to 15 percent.

The A horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is loam, very fine sandy loam, or clay loam. Reaction is mildly to strongly alkaline.

The C horizon has a color hue of 10YR or 2.5Y, value of 6 or 7 (4 or 5 moist), and chroma of 2 or 3 dry or moist. Texture is stratified loam, silt loam, and very fine sandy loam. Reaction is mildly to strongly alkaline.

GLOSSARY

Alluvium--Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil--A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping unit.

Available water capacity--The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point.

Badland--Steep or very steep, commonly nonstony barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Bedrock--The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land--The normal flood plain of a stream, subject to frequent flooding.

Calcareous soil--A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Channery soil--A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay--As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Coarse fragments--Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Cobblestone (or cobble)--A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium--Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex, soil--A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Consistence, soil--The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose--Noncoherent when dry or moist; does not hold together in a mass.
Friable--When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm--When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic--When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky--When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard--When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft--When dry, breaks into powder or individual grains under very slight pressure.

Eolian soil material--Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion--The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Flagstone--A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flooding--The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain--A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope--The inclined surface at the base of a hill.

Glacial drift--Pulverized and other rock material transported by glacial ice and then deposited. Also the assorted and unassorted material deposited by streams flowing from glaciers.

Glacial outwash--Gravel, sand, and silt, commonly stratified, deposited by melt water as it flows from glacial ice.

Glacial till--Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gravel--Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material--Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Gully--A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall.

Gypsum--Hydrous calcium sulphate.

Horizon, soil--A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

A horizon--The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material.

A2 horizon--A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

Horizons (continued)

B horizon--The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon--The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer--consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Lacustrine deposit--Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide--The rapid downhill movement of a mass of soil and loose rock generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Loam--Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess--Fine grained material, dominantly of silt-sized particles, deposited by wind.

Metamorphic rock--Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Miscellaneous areas--Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Neutral soil--A soil having a pH value between 6.6 and 7.3.

Permeability--The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are: very slow (less that 0.06 inch), slow (0.06 to 0.20 inch), moderately slow (0.2 to 0.6 inch), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20 inches), and very rapid (more than 20 inches).

Phase, soil--A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value--(See Reaction, soil)--A numerical designation of acidity and alkalinity in soil.

Profile, soil--A vertical section of the soil extending through all its horizons and into the parent material.

Range condition--Range condition is the present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. Range condition is basically an ecological rating of the plant community. Air-dry weight is the unit of measure used in comparing the composition and production of the present plant community with that of the climax community.

Range site--A range site is a distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind or proportion of species or in total production.

Reaction, soil--The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described

Reaction, soil (continued)

as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as pH.

Residuum (residual soil material)--Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rock fragments--Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Sand--As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone--Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock--Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Series, soil--A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shale--Sedimentary rock formed by the hardening of a clay deposit.

Silt--As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slope--The inclination of the land surface from the horizontal. Per-

Slope (continued)

centage of slope is the vertical distance divided by the horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Sodic soil--A soil having so high a degree of alkalinity (pH 8.5 or higher) that plant growth is restricted.

Soil--A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates--Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: very coarse sand (2.0 millimeters to 1.0 millimeter); medium sand (0.5 to 0.25 millimeter); fine sand (0.25 to 0.10 millimeter); very fine sand (0.10 to 0.05 millimeter); silt (0.005 to 0.002 millimeter); and clay (less than 0.002 millimeter).

Stones--Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Structure, soil--The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil--Technically, the B horizon; roughly, the part of the solum below plow depth.

Surface soil--The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters).

Terrace (geologic)--An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil--The relative proportions of sand, silt. and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Toe slope--The outermost inclined surface at the base of a hill; part of a foot slope.

Upland--Land at a higher elevation, in general, then the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil--A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Weathering--All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

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APPENDIX: RANGE SITES

Range sites identified in the Salt Wells Area. Complete range site descriptions from the Soil Conservation Service Technical Guide are presented in the following order:

- Sandy 5-9" PZ
- Loamy 5-9" PZ
- Shallow sandy 5-9" PZ
- Shallow loamy 5-9" PZ
- Saline upland 5-9" PZ
- Gravelly 5-9" PZ
- Shale 5-9" PZ
- Saline lowland 10-14" PZ
- Sandy 10-14" PZ
- Loamy 10-14" PZ
- Clayey 10-14" PZ
- Shallow sandy 10-14" PZ
- Shallow loamy 10-14" PZ
- Shallow clayey 10-14" PZ
- Saline upland 10-14" PZ
- Gravelly 10-14" PZ
- Very shallow 10-14" PZ
- Loamy 15-19" PZ
- Clayey 15-19" PZ
- Shallow loamy 15-19" PZ
- Shallow clayey 15-19" PZ
- Very shallow 15-19" PZ

Technical Guide
Section II E
Major Land Resource Area (32)

SANDY (Sy)
5-9" Big Horn and Wind River Basins
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in the upland position on slopes of less than 20%. Elevation range of this site is from 3,700 feet to 6,000 feet.

2. Climatic Features

See attached climate description

3. Native (climax) Vegetation

a. The climax plant community is characterized by a mixture of plants that prefer a sandy texture soil. The vegetation is a mixture of 70% grasses and grass-like plants, 15% forbs and 15% woody plants.

b. Major plant species and percentage of the total plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Rhizomatous wheatgrasses	10-20
Western wheatgrass	
Thickspike wheatgrass	
Streambank wheatgrass	
Needleandthread grass	30-50
Indian ricegrass	10-20
Prairie junegrass	5-10
Bluebunch wheatgrass	5-10
Blue grama grass	5-10
Sandberg bluegrass	T-5
Forbs	
All following Forbs	5-15*
Winterfat	
Phlox	
Fleabane	
Scarlet golbemallow	

Onion
False Carrot

Woody Plants

Big sagebrush	5-15
Spiny hopsage	T-5

c. Percent ground cover -- 40-50 percent.

d. As the range condition deteriorates, big sagebrush becomes dominant. Species that are not a part of the climax plant community, but are most likely to invade this site if conditions decline are cheatgrass, gumweed, poverty weed, burdock and stickseed

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 600 pounds
Median years - 375 pounds
Unfavorable years - 225 pounds

5. Soils

a. The soils associated with this site are fine sandy loams, sandy loams, or loamy fine sands provided the topsoil is not less than 3 inches. These soils are 15 inches or more in depth. These soils take up moisture readily. Plant soil moisture relationships are very good.

b. Soil taxonomic units which characterize this site are:

Apron Griffy Wallson Worland

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is valuable for all season utilization by all kinds of domestic livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	50
Good - high fair	60
Fair	75

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrolgic curves.)

5. Recreational and Natural Beauty

Recreation potential for this site is good. Primary recreation uses are hunting, hiking and camping.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon, and blackfooted ferret. Threatened or endangered plant species on this site are payson penstemon (Fremont Co.).

7. Location of Typical Example of the Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.20	5
Good	51 - 75	.16	6.3
Fair	26 - 50	.10	10
Poor	0 - 25	.05	20

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE	SHEEP	HORSES	DEER	ANTELOPE
Needleandthread grass	1	1	1	1	1
Prairie junegrass	2	2	2	2	2
Indian ricegrass	1	1	1	1	1
Bluebunch wheatgrass	1	1	1	2	2
Western wheatgrass	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2
Blue grama grass	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2
Winterfat	1	1	1	1	1
Phlox	3	3	3	3	3
Fleabane	2	2	2	2	2
Scarlet globemallow	2	2	2	2	2
False carrot	3	2	3	3	3
Big sagebrush	2	2	3	2	2
Spiny hopsage	3	3	3	3	3

9. Field Offices

Cody
Dubois
Greybull
Lander
Lovell
Powell
Riverton
Worland
Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32)

LOAMY (Ly)
5-9" Big Horn and Wind River Basins
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in the upland position on slopes less than 50%, and where soil depth exceeds 15 inches. Elevation ranges from 3,700 feet to 6,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by mid cool season grasses. Potential vegetation is about 75% grasses and grass-like plants, 10% forbs and 15% woody plants.

b. Major plant species and percentage of the total plant community by air-dry weight)

SPECIES	PERCENT
Grasses and Grass-like Plants	
Rhizomatous wheatgrasses	10-20
Western wheatgrass	
Thickspike wheatgrass	
Streambank wheatgrass	
Needleandthread grass	10-20
Blue grama grass	5-10
Indian ricegrass	T-10
Bluebunch wheatgrass	30-50
Prairie junegrass	T-5
Sandberg bluegrass	T-5
Forbs	
All following Forbs	T-15*
Scarlet globemallow	
Phlox	
Fleabane	
Paintbrush	
Onion	

False carrot
Larkspur
Winterfat

Woody Plants

Big sagebrush	5-15
Rabbitbrush	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover -- 30-40 percent.

d. As the ecological condition changes by deterioration, blue grama, sandberg bluegrass, and big sagebrush become more dominant. Species most likely to invade the site as cover deteriorates are cheatgrass, gumweed, poverty weed, Canada thistle and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 600 pounds
Median years - 365 pounds
Unfavorable years - 225 pounds

5. Soils

a. Soils associated with this site are very fine sandy loams, loams, silt loams, light sandy clay loams, light silty clay loams, and light clay loams. These soils are 15 inches or more in depth. Soils have good plant soil moisture relationship and take up moisture fairly readily.

b. Soil taxonomic units which characterize this site are:

Fruita Neiber Garland Lostwells Rairdent Emblem
Bowbac Sharland Kinnear

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site produces excellent forage for cattle, horses and sheep during the entire year.

2. Wood Products

No trees occur on this site.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	55
Good - high fair	65
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreational and Natural Beauty

Recreational potential for this site is fair. Primary recreation uses are hunting, hiking, camping and picnicking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the peregrine falcon and prairie falcon (winter months) and the black-footed ferret (year round). There are no known threatened or endangered plants on this site.

7. Location of Typical Example of the Site (To be determined at the local field office level)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.20	5.00
Good	51 - 75	.16	6.25
Fair	26 - 50	.10	10.00
Poor	0 - 25	.05	20.00

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE	SHEEP	HORSES	DEER	ANTELOPE
Needleandthread grass	1	1	1	1	1
Indian ricegrass	1	1	1	1	1
Bluebunch wheatgrass	1	1	1	2	2
Western wheatgrass	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2
Prairie junegrass	2	2	2	2	2
Blue grama	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2
Scarlet globemallow	2	2	2	2	2
Phlox	3	3	3	3	3
Fleabane	2	2	2	2	2
Paintbrush	2	2	2	2	2
Onion	2	2	2	2	2
False carrot	3	2	3	3	3
Larkspur	*1/	2	2	2	2
Winterfat	1	1	1	1	1
Big sagebrush	2	2	3	2	2
Rabbitbrush	3	1	3	2	1

*1/ Poisonous in spring

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32)

SHALLOW SANDY (SwSy)
5-9" Big Horn and Wind River B
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISITCS

1. Physiographic Features

This site usually occurs in the upland position. However, it found on all slopes and positions. Elevations on this site from 3,700 feet to 6,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by cool season Potential vegetation is about 75% grasses and grass-li 10% forbs, and 15% woody plants.

b. Plant species and percentage composition of this plant c by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Rhizomatous wheatgrass	15-3
Western wheatgrass	
Thickspike wheatgrass	
Streambank wheatgrass	
Needleandthread grass	25-
Indian ricegrass	10-
Bluebunch wheatgrass	10-
All following Grasses and Grass-like Plants	T-
Bottlebrush squirreltail	
Prairie junegrass	
Blue grama grass	
Sandberg bluegrass	
Upland sedges	
Forbs	
All following Forbs	T-10
Larkspur	

Phlox
Fleabane
Scarlet globemallow
Onion
False carrot

Woody Plants

Silver sagebrush	T-10
Big sagebrush	T-5
Rubber rabbitbrush	T-5
Shadscale	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover — 20-30 percent.

d. As the ecological condition changes by deterioration, big sagebrush and forbs become more dominant. Species most likely to invade the site as cover deteriorates are cheatgrass, gumweed, poverty weed and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 600 pounds
Median years - 375 pounds
Unfavorable years - 225 pounds

5. Soils

a. The soil depth ranges from 8 to 15 inches over bedrock of any kind except igneous or volcanic, which is virtually impermeable to plant roots. The soil textures are a fine sandy loam or coarser. Thin ineffectual layers of other textures are disregarded. Production is less for this site than sandy because moisture holding capacity of soils has been reduced by shallower depth to bedrock.

b. Soil taxonomic units which characterize this site are:

Oceanet

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage for all seasons of the year for cattle, horses and sheep.

2. Wood Products

No trees occur on this site.

3. Wildldife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate to high runoff. The soil cover complex numbers are:

Excellent	70
Good - high fair	75
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreational and Natural Beauty

Recreational potential for this site is low. Recreational use is primarily hunting.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the peregrine falcon (winter months) and prairie falcon. Threatened or endangered plant species on this site are payson penstemon (Fremont County).

7. Location of Typical Example of the Site (To be determined at the local field office level)

8. Other Pertinent Information

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.10	10.00
Good	51 - 75	.08	12.50
Fair	26 - 50	.05	20.00
Poor	0 - 25	.03	33.33

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

PLANT SPECIES	ELK&CATTLE	SHEEP	HORSES	DEER	ANTELOPE
Western wheatgrass	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2
Needleandthread grass	1	1	1	1	1
Indian ricegrass	1	1	1	1	1
Bluebunch wheatgrass	1	1	1	2	2
Bottlebrush squirreltail	2	2	2	3	2
Prairie junegrass	2	2	2	2	2
Blue grama	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2
Upland sedges	2	2	2	2	2
Larkspur	*	2	2	2	2
Phlox	3	3	3	3	3
Fleabane	2	2	2	2	2
Scarlet globemallow	2	2	2	2	2
Onion	2	2	2	2	2
False carrot	3	2	3	3	3
Silver sagebrush	2	2	2	1	1
Big sagebrush	2	2	3	2	2
Rubber rabbitbrush	3	1	3	2	1
Shadscale	3	3	3	3	3

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32)

SHALLOW LOAMY (SwLy)
5-9" Big Horn and Wind River Basins
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site is found on steep slopes in the upland position. However, it may be found on all slopes in all positions. Elevations range from 3,700 feet to 6,000 feet in the Wind River Basin.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by cool season mid-grasses. Potential vegetation is about 80% grasses and grass-like plants, 10% forbs and 10% woody plants.

b. Plant species and percentage composition of this plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Rhizomatous wheatgrass	15-25
Western wheatgrass	
Thickspike wheatgrass	
Streambank wheatgrass	
Bluebunch wheatgrass	25-35
Indian ricegrass	10-25
Needleandthread grass	5-10
All following Grasses and Grass-like Plants	5-15*
Prairie junegrass	
Blue grama grass	
Sandberg bluegrass	
Upland sedges	
Forbs	
All following Forbs	T-10*
Scarlet globemallow	
Phlox	

Fleabane
Paintbrush
Onion
False carrot
Larkspur

Woody Plants

Big sagebrush	T-10
Low rabbitbrush	T-5

*Of plants in thest groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover -- 20-30 percent.

d. As the ecological condition changes by deterioration, big sagebrush, short grasses, and forbs become more dominant. Species most likely to invade the site as cover deteriorates are cheatgrass, gumweed, poverty weed, stickseed and false toadflax.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 500 pounds
Median years	- 375 pounds
Unfavorable years	- 225 pounds

5. Soils

a. The soil depth ranges from 8 to 15 percent over bedrock from any kind except igneous, which is virtually impermeable to plant roots. Soil textures range from a very fine sandy loam to the light sandy clay loams, light silty clay, and clay loams. Thin inneffectual layers of other textures are disregarded. Production is less on this site than for loamy because moisture holding capacity of the soil has been reduced by shallower depths to bedrock.

b. Soil taxonomic units which characterize this site are:

Hoot

c. Complete soil descriptions are available in the soil survey descriptive legend.

Technical Guide
Section II E
Major Land Resource Area (32)

SALINE UPLAND (SU)
5-9" Big Horn and Wind River Basins
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs on all slopes in an upland position. Elevations range from 3,700 feet to 6,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by halophytes, salt-loving plants, and drought-resistant grasses. Potential vegetation is about 40% grasses and grass-like plants, 10% forbs and 50% gardner's saltbush and other woody plants.

b. Plant species and percentage composition of this plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Indian ricegrass	15-25
Bottlebrush squirreltail	10-25
Western wheatgrass	5-10
Sandberg bluegrass	T-5
Forbs	
All following Forbs	T-10*
Woody aster	
Salsify	
Onion	
Milkvetch	
Winterfat	T-5
Woody Plants	
Gardner's saltbush	30-50
Bud sagebrush	T-10
All following Woody Plants	T-5*

Birdsfoot sagebrush
Greasewood

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover -- 10-20 percent.

d. As the ecological condition changes by deterioration, birdsfoot sagebrush and annuals become more dominant. Species most likely to invade the site as cover deteriorates are stickseed, mustard, cheatgrass, prickly pear, plantago and Russian thistle.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 550 pounds
Median years - 350 pounds
Unfavorable years - 200 pounds

5. Soils

a. The soils associated with this site are various depths, but generally 8 inches or more in depth. Top soil textures and subsoil permeability are variable. The first 8 to 20 inches has zones where the salt content exceeds .2 percent and/or 15 percent exchangeable sodium. The pH is usually greater than 8.5 in the surface soils. Halophytes are always a major part of the plant community in climax condition. These soils appear extremely droughty due to high salt content.

b. Soils taxonomic units which characterize this site are:

Muff, Greybull, Persayo, Uffens, Stutzman, Chipeta, Deaver, Sayles, Cestnik, Torchlight, Bributte

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage for summer, fall, and winter for cattle, sheep and horses.

2. Wood Products

No trees occur on this site.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate to high runoff. The soil cover complex numbers are:

Excellent	80
Good - high fair	85
Fair	90

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is low. Primary recreation use is hunting.

6. Threatened or Endangered Plant and Animals

Threatened or endangered animal species found on this site are the prairie falcon and peregrine falcon (winter months). Threatened or endangered plant species found on this site are payson penstemon (Fremont Co.).

7. Location of Typical Example of the Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.20	5.00
Good	51 - 75	.15	6.70

Fair	26 - 50	.10	10.00
Poor	0 - 25	.05	20.00

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE	SHEEP	HORSES	DEER	ANTELOPE
Indian ricegrass	1	1	1	1	1
Bottlebrush squirreltail	2	2	2	3	2
Western wheatgrass	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2
Woody aster	*	*	*	*	*
Salsify	3	3	3	3	3
Onion	2	2	2	2	2
Milkvetch	2	2	2	2	2
Winterfat	1	1	1	1	1
Gardner's saltbush	1	1	2	1	1
Bud sagebrush	1	1	2	1	1
Birdsfoot sagebrush	3	3	3	3	3
Greasewood	2	2	3	2	2

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32)

GRAVELLY (Gr)
5-9" Big Horn & Wind River Basins
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site may be found in most positions, but usually occurs at terrace breaks and along stream courses. Elevations range from 3,700 feet to 6,000 feet.

2. Climatic Features

See attached climate description

3. Native (climax) Vegetation

a. The climax plant community is dominated by cool season mid-grasses. Potential vegetation is about 70% grasses and grass-like plants, 15% forbs and 15% woody plants.

b. Plant species and percentage composition of this plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Bluebunch wheatgrass	35-50
Needleandthread grass	10-25
Western wheatgrass	5-15
Indian ricegrass	5-10
All following Grasses and Grass-like Plants	T-15*
Bottlebrush squirreltail	
Sandberg bluegrass	
Upland sedges	
Prairie junegrass	
Forbs	
All following Forbs	T-10*
Phlox	
Larkspur	
Scarlet globemallow	
Winterfat	T-5

Woody Plants

Big sagebrush	5-15
Yucca	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover -- 20-30 percent.

d. As the ecological condition changes by deterioration, big sagebrush and forbs become more dominant. Species most likely to invade the site as cover deteriorates are cheatgrass, gumweed, poverty weed, stickseed and yellow clover.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 300 pounds
Median years - 200 pounds
Unfavorable years - 100 pounds

5. Soils

a. Soils associated with this site are very gravelly, droughty, usually of sandy texture, more than 20 inches deep over clean gravel or bedrock. The majority of the coarse fragments range from 2 mm to 3 inches in diameter, cover 50 to 75 percent of the soils surface, and usually make up 40 to 50 percent by volume of the soil mass. These soils surface are relatively unstable from a geological standpoint.

b. Soil taxonomic units which characterize this site are:

Clifterson Willwood Preatorson

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage for all seasons of the year for cattle, sheep and horses.

2. Wood Products

No trees occur on this site.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for low to moderate runoff. The soil cover complex numbers are:

Excellent	45
Good - high fair	55
Fair	70

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreational and Natural Beauty

Recreation potential for this site is low. Recreation use is primarily hunting.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animals found on this site are the peregrine falcon (winter months) and prairie falcon. Threatened or endangered plants found on this site are branched fleabane, cary penstemon, and payson penstemon (Fremont Co.)

7. Location of Typical Example of the Site (To bedetermine at the local field office level)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/ Acre	Acres/AUM
Excellent	76 - 100	.10	10.00
Good	51 - 75	.08	12.50

Fair	26 - 50	.05	20.00
Poor	0 - 25	.03	33.33

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE	SHEEP	HORSES	DEER	ANTELOPE
Needleandthread grass	1	1	1	1	1
Indian ricegrass	1	1	1	1	1
Prairie junegrass	2	2	2	2	2
Bluebunch wheatgrass	1	1	1	2	2
Bottlebrush squirreltail	2	2	2	3	2
Western wheatgrass	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2
Upland sedges	2	2	2	2	2
Phlox	3	3	3	3	3
Larkspur	*	2	2	2	2
Scarlet globemallow	2	2	2	2	2
Winterfat	1	1	1	1	1
Big sagebrush	2	2	3	2	2
Yucca	2	2	3	2	2

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32)

SHALE (Sh)
5-9" Big Horn and Wind River Basins
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site is usually found in the upland position and on steep slopes. Elevation ranges from 3,700 feet to 6,000 feet in the Wind River Basin.

2. Climatic Features

See attached climate description

3. Native (climax) Vegetation

a. The climax vegetation is dominated by plants that can withstand salty and droughty conditions. Potential vegetation is about 40% grasses and grass-like plants, 5% forbs and 55% woody plants.

b. Plant species and percentage composition of this plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Bottlebrush squirreltail	15-25
Western wheatgrass	5-10
Indian ricegrass	5-10
All following Grasses and Grass-like Plants	T-10*
Alkali sacaton	
Blue grama grass	
Sandberg bluegrass	
Forbs	
All following Forbs	T-5*
Milkvetch	
Woody aster	
Princesplume	
Woody Plants	
Gardner's saltbush	35-50
Birdsfoot sagebrush	T-10

Winterfat	T-5
Bud sagebrush	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover -- 10-15 percent.

d. As the ecological condition changes by deterioration, birdsfoot sagebrush and woody aster become more dominant. Species most likely to invade the site as cover deteriorates are gumweed, cheatgrass, poverty weed, burdock and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable Years	- 300 pounds
Median Years	- 175 pounds
Unfavorable Years	- 85 pounds

5. Soils

a. The soils associated with this site are generally less than 8 inches deep, with many outcroppings of clay shale bedrock. These shales are usually salty in varying degrees and normally produce sparse strands of halophytes, and some of the more salt-tolerant grasses. This site is very droughty because of the undeveloped salty shale material, the steepness of the slope, and the lack of vegetative cover.

b. Soil taxonomic units which characterize this site are:

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage for all seasons of the year for cattle, sheep and horses. Total production or stocking rates are limited due to the low productive nature of the site.

2. Wood Products

No trees occur on this site.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for high runoff. The soil cover complex numbers are:

Excellent	80
Good - high fair	85
Fair	90

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is low. Recreation use is primarily hunting.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the peregrine falcon (winter months) and prairie falcon and the blackfooted ferret (year around). Threatened or endangered plant species on this site are payson penstemon (Fremont Co.).

7. Location of Typical Example of the Site (To be determined at the local field office level)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.10	10.00
Good	51 - 75	.08	12.50
Fair	26 - 50	.05	20.00
Poor	0 - 25	.03	33.33

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE	SHEEP	HORSES	DEER	ANTELOPE
Western wheatgrass	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	3	2
Indian ricegrass	1	1	1	1	1
Alkali sacaton	1	2	1	2	2
Blue grama	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2
Milkvetch	2	2	2	2	2
Woody aster	*	*	*	*	*
Princesplume	*	*	*	*	*
Gardner's saltbush	1	1	2	1	1
Winterfat	1	1	1	1	1
Bud sagebrush	1	1	1	1	1
Birdsfoot sagebrush	3	3	3	3	3

9. Field Offices

Cody
Dubois
Greybull
Lander
Lovell
Powell
Riverton
Worland
Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

SALINE LOWLAND (SL)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in lowland positions. Elevations range from 4,500 to 7,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by tall grasses that can tolerate some wetness and salinity. Potential vegetation is about 65% grasses and grass-like plants, 10% forbs and 25% woody plants

b. Plant species and percentage composition of the plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Alkali sacaton	15-25
Basin wildrye	15-25
Canada wildrye	T-10
Western wheatgrass	T-10
All following Grasses and Grass-like Plants	T-10*
Inland saltgrass	
Bottlebrush squirreltail	
Sandberg bluegrass	
Forbs	
All following Forbs	T-10*
Woody aster	
Onion	
Phlox	
Woody Plants	
Greasewood	10-20

Rubber rabbitbrush	T-5
Shadscale	T-5
Roses	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover -- 40-50 percent.

d. As the ecological condition changes by deterioration, greasewood and inland saltgrass become more dominant. Species most likely to invade the site as cover deteriorates are halogeton, mustards, Russian thistle and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 1,200 pounds
Median years	- 900 pounds
Unfavorable years	- 600 pounds

5. Soils

a. This site consists of soils containing at least moderate amounts of salinity or alkalinity. The subsoil is moistened by overflow, subirrigation from a deep water table, or irrigation of adjacent land. When a water table exists, it is not close enough to the surface to benefit herbaceous plants. Soil texture and depth vary considerably. Vegetation is dominated by greasewood.

b. Soil taxonomic units which characterize this site are:

Haverson

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage for all seasons of the year for cattle, sheep and horses.

2. Wood Products

No trees occur on this site.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	60
Good - high fair	70
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is mainly low. Primary recreation use is hunting.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species found on this site are the prairie falcon (year round). Threatened or endangered plant species on this site are payson penstemon.

7. Location of Typical Example of the Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.50	2.0
Good	51 - 75	.40	2.5
Fair	26 - 50	.15	6.7
Poor	0 - 25	.10	10.0

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Alkali sacaton	1	2	1	2	2	2	2
Basin wildrye	1	1	1	2	2	2	1
Canada wildrye	1	1	1	2	2	1	1
Western wheatgrass	2	2	2	2	2	2	2
Inland saltgrass	3	3	3	3	3	3	3
Bottlebrush squirreltail	2	2	2	3	2	3	2
Sandberg bluegrass	2	2	2	2	2	2	2
Woody aster	*	*	*	*	*	*	*
Onion	2	2	2	2	2	2	2
Phlox	3	3	3	3	3	3	3
Greasewood	2	2	3	2	2	3	3
Rubber rabbitbrush	3	1	3	2	1	2	2
Shadscale	3	3	3	3	3	3	3
Rose	2	2	3	2	2	2	2

9. Field Offices

Cody
Dubois
Greybull
Lander
Lovell
Powell
Riverton
Worland
Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

SANDY (Sy)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in the upland position, on slopes of less than 50%. Elevations range on this site from 4,500 to 7,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by cool season grasses. Big sagebrush can be found in the climax plant community. Potential vegetation is about 75% grasses and grass-like plants, 15% forbs and 10% woody plants.

b. Plant species and percentage composition of the plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Needleandthread grass	15-25
Bluebunch wheatgrass	10-25
Prairie junegrass	5-15
Rhizomatous wheatgrass	T-10
Western wheatgrass	
Thickspike wheatgrass	
Streambank wheatgrass	
Indian ricegrass	T-10
Prairie sandreed	T-10
All following Grasses and Grass-like Plants	5-15*
Upland sedge	
Blue grama	
Bottlebrush squirreltail	
Sand dropseed	
Spiked fescue	
Canby bluegrass	

Forbs

All following Forbs	T-15*
Scarlet globemallow	
Paintbrush	
Textile Onion	
Larkspur	
Death camas	
Elegant cinquefoil	

Woody Plants

Big sagebrush	T-10
Low rabbitbrush	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential community.

c. Approximate percent ground cover is — 25-35 percent.

d. As the ecological condition changes by deterioration, big sagebrush and upland sedges become more dominant. Species most likely to invade the site as cover deteriorates are cheatgrass, gumweed, poverty weed, and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 1,100 pounds
Median years	- 800 pounds
Unfavorable years	- 500 pounds

5. Soils

a. The soils associated with this site are fine sandy loams, sandy loams, or loamy very fine sands provided the topsoil is not less than 3 inches. These soils are 20 inches or more in depth. Coarser top soils may be included if underlain by finer textured subsoils. These soils take up moisture readily. Plant soil moisture relationships are very good.

b. Soil taxonomic units which characterize this site are:

Olney Mughouse Otero Nelson

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage in all seasons for all kinds of livestock.

2. Wood Products

None

3. Wildldife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	50
Good - high fair	60
Fair	70

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential is low. Primary recreation use is hunting.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species found on this site are the prairie falcon (year round)and blackfooted ferret (year round). Plants found on this site are narrowed ricegrass(Hot Springs Co.) and payson penstemon (Fremont Co.).

7. Location Of Typical Example of the Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.60	1.7
Good	51 - 75	.50	2.0
Fair	26 - 50	.25	4.0
Poor	0 - 25	.15	6.7

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Western wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2	2	2
Canby bluegrass	1	1	1	1	1	1	1
Indian ricegrass	1	1	1	1	1	2	2
Bluebunch wheatgrass	1	1	1	2	2	1	2
Spike fescue	1	2	1	1	2	2	2
Prairie sandreed	1	2	1	3	3	2	2
Needleandthread grass	1	1	1	1	1	1	1
Upland sedge	2	2	2	2	2	2	2
Prairie junegrass	2	2	2	2	2	2	2
Blue grama	2	2	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	3	2	3	3
Sand dropseed	2	2	2	3	3	3	3
Scarlet globemallow	2	2	2	2	2	2	2
Paintbrush	2	2	2	2	2	2	2
Textile onion	2	2	2	2	2	2	2
Larkspur	2	2	2	2	2	2	2
Death camas	*	*	*	*	*	*	*
Elegant cinquefoil	3	3	3	3	3	3	3
Big sagebrush	2	2	3	2	2	2	2
Low rabbitbrush	1	2	1	1	1	2	2

9. Field Offices

Cody Greybull Lovell Riverton Thermopolis
Dubois Lander Powell Worland

Technical Guide
Section II E
Major Land Resource Area (32) (46)

LOAMY (Ly)
10-14" Foothills & Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in the upland positions on slopes less than 50 percent. It is found on all exposures. Elevation ranges from 4,500 to 7,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. This plant community is characterized by a variety of plants which prefer a medium textured soil with moderate permeability. Potential vegetation is about 75% grasses and grass-like plants, 15% forbs and 10% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Bluebunch wheatgrass	35-45
Needleandthread grass	5-15
Rhizomatous wheatgrasses	5-15*
Western wheatgrass	
Thickspike wheatgrass	
Streambank wheatgrass	
Green needlegrass	T-10
Indian ricegrass	T-10
Spike fescue	T-10
All following Grasses and Grass-like Plants	T-10*
Blue grama	
Threadleaf sedge	
Prairie junegrass	
Basin wildrye	
Griffiths wheatgrass	

Forbs

Winterfat	T-5
All following Forbs	5-10*
Phlox	
Pussytoes	
Larkspur	
Paintbrush	
Goldenweed	
Penstemon	

Woody Plants

Big sagebrush	T-10

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Percent ground cover ranges from 25-35 percent.

d. Plants such as big sagebrush tend to be more dominant as range condition deteriorates. Species that are not a part of the plant climax community, but are most likely to invade this site if condition declines, are cheatgrass, gumweed, poverty weed , Canada thistle, and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 1,100 pounds
Median years	- 800 pounds
Unfavorable years	- 500 pounds

5. Soils

a. The soils associated with this site are very fine sandy loams, silt loams, light sandy clay loams, light silty clay loams, and light clay loams, provided the topsoil is not less than 3 inches. These soils are 20 inches or more in depth. They take up moisture readily and the plant - soil moisture relationships are very good. Some of these soils are very erosive, particularly soils derived from the Chugwater formation.

b. Soil taxonomic units which characterize this site are:

Fort Collins, Bidman, Neville, Tensleep,Gystrum

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is dominated by grasses. Its accessibility by livestock make it valuable for all seasons of use by all forms of domestic livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	55
Good - high fair	65
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is fair. Primary recreation uses are hunting, hiking, camping and picnicking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon (year round) and blackfooted ferret (year round). Threatened or endangered plant species on this site are payson penstemon (Fremont Co.).

7. Location of Typical Example of Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.4	2.5
Good	51 - 75	0.3	3.3
Fair	26 - 50	0.2	5.0
Poor	0 - 25	0.1	10.0

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Green needlegrass	1	1	1	1	1	1	1
Canby bluegrass	1	1	1	1	1	1	1
Indian ricegrass	1	1	1	1	1	2	2
Spike fescue	1	2	1	1	2	2	2
Bluebunch wheatgrass	1	1	1	2	2	1	2
Basin wildrye	1	1	1	2	2	2	1
Griffiths wheatgrass	2	2	2	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Blue grama	2	2	2	2	2	2	2
Threadleaf sedge	2	2	2	2	1	2	2
Prairie junegrass	3	3	3	3	3	3	3
Winterfat	1	1	1	1	1	1	1
Phlox	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Larkspur	2	2	2	2	2	2	2
Paintbrush	2	2	2	2	2	2	2

Goldenweed	3	3	3	3	3	3	3
Penstemon	1	1	1	1	1	1	1
Big sagebrush	2	2	3	2	2	2	2

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

CLAYEY (CY)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in upland position on slopes less than 50%. It is found on all exposures. Elevations range from 4,500 to 7,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is characterized by plants which prefer a heavy textures soil with good water-holding capacity. The vegetation is a mixture of 75% grasses and grass-like plants, 10% forbs and 15% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Indian ricegrass	10-25
Bluebunch wheatgrass	10-25
Rhizomatous wheatgrasses	10-20
Western wheatgrass	
Thickspike wheatgrass	
Mutton bluegrass	5-10
Bottlebrush squirreltail	T-10
Green needlegrass	T-10
All following Grasses and Grass-like Plants	5-10*
Sandberg bluegrass	
Prairie junegrass	
Canby bluegrass	
Spike fescue	
Griffiths wheatgrass	
Forbs	
Winterfat	T-5

All following Forbs	T-10*
Phlox	
Scarlet globemallow	
Paintbrush	
Woody aster	
Fleabane	
False carrot	

Woody Plants

All following Woody Plants	5-15*
Bud sagebrush	
Gardner saltbush	
Big sagebrush	
Greasweood	
Rubber rabbitbrush	
Birdsfoot sagebrush	

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Percentage gound cover ranges from — 25-35 percent.

d. Big sagebrush and forbs tend to dominate this site as range conditions deteriorate. Species that are not a part of the climax plant community, but are most likely to invade this site if conditions decline are cheatgrass, gumweed, poverty weed, burdock, and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 1,100 pounds
Median years	- 800 pounds
Unfavorable years	- 500 pounds

5. Soils

a. The soils associated with this site are silty clays, the finer portions of sandy clay loams, silty clay loams, and clays which do not develop severe cracks or become hard when dry and sticky when wet. Topsoil must be at least 2 inches deep with a minimum soil depth of 20 inches. The soils have good water holding capacity and plant - soil moisture relationships are good.

b. Soil taxonomic units which characterize this site are:

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is valuable for all seasons use by all kinds of domestic livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	65
Good - high fair	70
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic)

5. Recreation and Natural Beauty

Recreation potential is fair. Primary recreation uses are hunting, camping and hiking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon (year round) and blackfooted ferret (year round). There are no know threatened or endangered plant species on this site.

7. Location of Typical Examples of this Site (To be determined at the local field office level.)

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

SHALLOW SANDY (SwSy)
10-14" Foothills & Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site is found on steep slopes in the upland position; however, it may be found on all slopes and positions. Elevations on this site range from 4,500 to 7,000 feet.

2. Climatic Features

See attached description.

3. Native (climax) Vegetation

a. The climax plant community is characterized by plants which can grow with restricted root depths and relative droughty conditions. Potential vegetation is about 75% grasses and grass-like plants, 15% forbs and 10% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Indian ricegrass	15-25
Bluebunch wheatgrass	15-25
Needleandthread grass	5-15
Rhizomatous wheatgrasses	5-10
Western wheatgrass	
Thickspike wheatgrass	
Streambank wheatgrass	
Canby bluegrass	
All following Grasses and Grass-like Plants	5-15*
Prairie junegrass	
Blue grama	
Sandberg bluegrass	
Bottlebrush squirreltail	
Upland sedge	
Griffith's wheatgrass	
Spike fescue	
Green needlegrass	

Forbs

Winterfat	T-5
All following Forbs	T-10*
Phlox	
Pussytoes	
Paintbrush	
Scarlet globemallow	
Penstemon	

Woody Plants

All following Woody Plants	T-10*
Big sagebrush	
Black sagebrush	
Low rabbitbrush	

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Percent ground cover ranges from 20-30 percent.

d. As the range condition deteriorates, rhizomatous wheatgrass, bluegrass, big sagebrush, and forbs become more dominant. Species that are no a part of the climax plant community but are most likely to invade this site if conditions decline are cheatgrass, gumweed, poverty weed and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 700 pounds
Median years - 500 pounds
Unfavorable years - 350 pounds

5. Soils

a. The soil depth ranges from 10 to 20 inches deep over bedrock of any kind except igneous or volcanic which is virtually impenetrable to plant roots. The soil textures are fine sandy loam or coarser; thin ineffectual layers of other textures are disregarded. These soils have less moisture-storing ability than do the deeper soils.

b. Soil taxonomic units which characterize this site are:

Bondman

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is valuable for all season use by all kinds of domestic livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	70
Good - high fair	75
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreational and Natural Beauty

Recreation potential for this site is fair. Primary recreation uses are hunting, camping and hiking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon (year round). Threatened or endangered plant species on this site are narrowed ricegrass, cary penstemon, payson penstemon (Fremont Co.) and sword townsendia.

7. Location of Typical Examples of Site (To be determined at local field offices level)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.2	5.0
Good	51 - 75	0.17	5.9
Fair	26 - 50	0.10	10.0
Poor	0 - 25	0.05	20.0

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Western wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2	2	2
Canby bluegrass	1	1	1	1	1	1	1
Green needlegrass	1	1	1	1	1	2	2
Indian ricegrass	1	1	1	1	1	1	1
Spike fescue	1	2	1	1	2	2	2
Bluebunch wheatgrass	1	1	1	2	2	1	2
Briffith's wheatgrass	2	2	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Prairie junegrass	2	2	2	2	2	2	2
Blue grama	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	3	2	3	3
Upland sedge	2	2	2	2	2	2	2
Phlox	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Paintbrush	2	2	2	2	2	2	2
Scarlet globemallow	2	2	2	2	2	2	2
Penstemon	1	1	1	1	1	1	1
Winterfat	1	1	1	1	1	1	1
Big sagebrush	2	2	3	2	2	2	2
Black sagebrush	3	1	3	1	1	3	2
Low rabbitbrush	1	2	1	1	1	2	2

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

SHALLOW LOAMY (SwLy)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site is found on steep slopes in the upland position; however, it may be found on all slopes in all positions. Elevation ranges from 4,500 to 7,000 feet in the Wind River Basin.

2. Climatic Features

See attached description.

3. Native (climax) Vegetation

a. The climax plant community is characterized by plants with restricted root growth and drought conditions. Potential vegetation is about 75% grasses and grass-like plants, 10% forbs and 15% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Bluebunch wheatgrass	25-50
Needleandthread grass	5-15
Indian ricegrass	5-10
Prairie juengrass	5-10
Rhizomatous wheatgrasses	5-10
Western wheatgrass	
Streambank wheatgrass	
Thickspike wheatgrass	
All following Grasses and Grass-like Plants	5-10*
Sandberg bluegrass	
Bottlebrush squirreltail	
Upland sedge	
Canby bluegrass	
Green needlegrass	
Spike fescue	

Griffith's wheatgrass
Blue grama

Forbs

Winterfat	T-5
All following Forbs	T-10*
Phlox	
Pussytoes	
Paintbrush	
Scarlet globemallow	
Penstemon	

Woody Plants

All follow Woody Plants	5-15*
Big sagebrush	
Black sagebrush	
Low rabbitbrush	

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Percent ground cover ranges from 20-30 percent.

d. As the range condition deteriorates, rhizomatous wheatgrasses, blue grasses, and big sagebrush and forbs become more dominant. Species that are not a part of the climax community, but are most likely to invade this site if conditions decline, are cheatgrass, gumweed, poverty weed, stickseed, and false toadflax.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 700 pounds
Median years	- 500 pounds
Unfavorable years	- 350 pounds

5. Soils

a. The soil depth ranges from 10 to 20 inches over bedrock of any kind except igneous which is virtually impenetrable to plant roots. Soil textures range from a very fine sandy loam to the light sandy clay loams, light silty clay, and clay loams. Thin ineffectual layers of other textures are disregarded. These soils have less moisture storing ability than do the deeper soils.

b. Soil taxonomic units which characterize this site are:

Spearfish, Rekop, Worf

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site makes valuable grazing for all seasons for all kinds of domestic levestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate to high runoff. The soil cover complex numbers are:

Excellent	70
Good - high fair	75
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is fair. Primary recreation uses are hunting, camping, and hiking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon (year round). Threatened or endangered plant species on this site are cary penstemon, payson penstemon (Fremont Co.) and sword townsendia.

7. Location of Typical Examples of Site (To be determined at local field office level)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.2	5.0
Good	51 - 75	0.17	5.9
Fair	26 - 50	0.10	10.0
Poor	0 - 25	0.05	20.0

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Canby bluegrass	1	1	1	1	1	1	1
Green needlegrass	1	1	1	1	1	1	1
Indian ricegrass	1	1	1	1	1	2	2
Spike fescue	1	2	1	1	2	2	2
Bluebunch wheatgrass	1	1	1	2	2	1	2
Griffith's wheatgrass	2	2	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Prairie junegrass	2	2	2	2	2	2	2
Blue grama	2	2	2	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	2	2	2	2
Upland sedge	2	2	2	2	2	2	2
Phlox	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Paintbrush	2	2	2	2	2	2	2
Scarlet globemallow	2	2	2	2	2	2	2

Penstemon	1	1	1	1	1	1	1
Winterfat	1	1	1	1	1	1	1
Big sagebrush	2	2	3	2	2	2	2
Black sagebrush	3	1	3	1	1	3	2
Low rabbitbush	1	2	1	1	1	2	2

9. Field Offices

Cody
Dubois
Greybull
Lander
Lovell
Powell
Riverton
Worland
Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)
CLAYEY
SHALLOW (SwCy)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site is usually found on steep slopes however, it may occur on all slopes and positions. Elevations range from 4,500 to 7,000 feet.

2. Climatic Features

See attached description.

3. Native (climax) Vegetation

a. The climax plant community is characterized by plants which can stand and grow in heavy textures soils. Potential vegetation is about 75% grasses and grass-like plants, 15% forbs and 10% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Bluebunch wheatgrass	20-30
Indian ricegrass	15-25
Rhizomatous wheatgrasses	10-20
Western wheatgrass	
Streambank wheatgrass	
Thickspike wheatgrass	
Green needlegrass	T-10
All following Grasses and Grass-like Plants	5-15*
Prairie junegrass	
Sandberg bluegrass	
Bottlebrush squirreltail	
Blue grama	
Canby bluegrass	
Spike fescue	
Griffith's wheatgrass	

Forbs

Winterfat	T-5
All following Forbs	T-10*
Phlox	
Pussytoes	
Paintbrush	
Scarlet globemallow	
Penstemon	

Woody Plants

All following Woody Plants	T-10*
Big sagebrush	
Black sagebrush	
Low rabbitbrush	

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Percent ground cover ranges from 20-30 percent.

d. As the range condition deteriorates, rhizomatous wheatgrass and big sagebrush become more dominant. Species that are not a part of the climax plant community but are most likely to invade this site if conditions decline are cheatgrass, gumweed, burdock, poverty weed, and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 700 pounds
Median years	- 500 pounds
Unfavorable	- 350 pounds

5. Soils

a. The soils depth range from 10 to 20 inches deep over clay shale bedrock, which is virtually impenetrable to plant roots. Soil textures included in this site are silty clay, the finer portions of sandy clay loams, and all clays. Thin ineffectual layers of other soils textures are disregarded. These soils have less moisture holding ability than deeper soils.

b. Soil taxonomic units which characterize this site are:

Shingle Midway

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is valuable for all seasons of use by all kinds of domestic livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for high runoff. The soil cover complex numbers are:

Excellent	75
Good - high fair	80
Fair	85

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is fair. Primary recreation uses are hunting, camping, and hiking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon (year round). Threatened or endangered plant species on this site are cary penstemon, payson penstemon (Fremont Co.) and sword townsendia.

7. Location of Typical Examples of the Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.2	5.0
Good	51 - 75	0.17	5.9
Fair	26 - 50	0.1	10.0
Poor	0 - 25	0.05	20.00

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Green needlegrass	1	1	1	1	1	1	1
Indian ricegrass	1	1	1	1	1	1	1
Canby bluegrass	1	1	1	1	1	1	1
Spike fescue	1	2	1	1	2	2	2
Bluebunch wheatgrass	1	1	1	2	2	1	2
Griffith's wheatgrass	2	2	2	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2
Streambank wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Prairie junegrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	3	2	3	3
Blue grama	2	2	2	2	2	2	2
Phlox	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Paintbrush	2	2	2	2	2	2	2
Scarlet globemallow	2	2	2	2	2	2	2
Penstemon	1	1	1	1	1	1	1
Winterfat	1	1	1	1	1	1	1
Big sagebrush	2	2	3	2	2	2	2
Black sagebrush	3	1	3	1	1	3	2
Low rabbitbrush	1	2	1	1	1	2	2

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

SALINE UPLAND (SU)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs on all slopes in upland position. Elevation ranges from 4,500 to 7,000 feet.

2. Climatic Features

See attached description.

3. Native (climax) Vegetation

a. The climax plant community is characterized by drought-resistant and salt loving plants. Potential vegetation is about 35% grasses and grass-like plants, 10% forbs and 55% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Western wheatgrass	T-10
Indian ricegrass	T-10
Bluebunch wheatgrass	T-10
Bottlebrush squirreltail	T-10
All following Grasses and Grass-like Plants	T-10*
Blue grama	
Sandberg bluegrass	
Forbs	
Winterfat	T-5
All following Forbs	T-10*
Woody aster	
Onion	
Salsify	
Woody Plants	
Gardner's saltbush	40-60

Bud sagebrush	T-5
Birdsfoot sagebrush	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Percent ground cover ranges from 10-20 percent.

d. As the range condition deteriorates, birdsfoot sagebrush and Gardner's saltbush become more dominant. Species that are not a part of the climax plant community but are most likely to invade this site if conditions decline are cheatgrass, gumweed, poverty weed, stickseed and prickly pear.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 650 pounds
Median years	- 450 pounds
Unfavorable years	- 275 pounds

5. Soils

a. Soils associated with this site are various depths, but generally 20 inches or more. The top soil textures and subsoil permeability are variable. The first 15 to 20 inches have zones where the salt content exceeds 0.2 percent and/or 15 percent in exchangeable sodium. The pH is usually greater than 8.5 in the surface soils. Halophytes are always a major part of the plant community in the climax condition. Only the more salt tolerant and drought resistant grasses are found in this site.

b. Soil taxonomic untis which characterize this site are:

Arvada, Petrie, Limon, Thedalund, Gaynor

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is valuable for all seasons for utilization by all kinds of domestic livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	80
Good - high fair	85
Fair	90

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is low. Primary recreation use is hunting.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon (year round). Threatened or endangered plant species on this site are payson penstemon (Fremont Co.).

7. Location of Typical Examples of Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.25	4.0
Good	51 - 75	.20	5.0
Fair	26 - 50	.12	8.3

Poor	0 - 25	0.3	33.3

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Western wheatgrass	2	2	2	2	2	2	2
Indian ricegrass	1	1	1	1	1	2	2
Bluebunch wheatgrass	1	1	1	2	2	2	1
Bottlebrush squirreltail	2	2	2	3	2	3	3
Blue grama	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
Woody aster	*	*	*	*	*	*	*
Onion	2	2	2	2	2	2	2
Salsify	3	3	3	3	3	3	3
Winterfat	1	1	1	1	1	1	1
Gardner's saltbush	1	1	2	1	1	1	1
Bud sagebrush	1	1	2	1	1	2	1

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

GRAVELLY (GR)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site may be found in most positions, but usually occurs at terrace breaks and along stream courses. Elevations vary from 4,500 to 7,000 feet in the Wind River Basin.

2. Climatic Features

See attached description.

3. Native (climax) Vegetation

a. The climax plant community is characterized by plants which can withstand gravelly and droughty soils. Potential vegetation is about 70% grasses and grass-like Plants, 10% forbs and 20% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Bluebunch wheatgrass	25-35
Needleandthread grass	15-25
Indian ricegrass	15-25
Western wheatgrass	T-10
All following Grasses and Grass-like Plants	5-15*
Sandberg bluegrass	
Blue grama	
Bottlebrush squirreltail	
Sand dropseed	
Canby bluegrass	
Prairie junegrass	
Forbs	
Winterfat	T-5
All following Forbs	T-10*
Phlox	

Larkspur
Scarlet globemallow

Woody Plants

Black sagebrush	5-10
Antelope bitterbrush	T-5
Big sagebrush	T-5
Juniper	T-5

*Of plants in these groups, no more than 5% of any one species is allowable in the potential plant community.

c. Juniper occurs on this site and has a canopy cover of about 5%.

d. Percent ground cover ranges from 25-35 percent.

e. As the range condition deteriorates, big sagebrush, and forbs tend to become more dominant. Species that are not a part of the climax plant community but are most likely to invade the site as condition declines are cheatgrass, gumweed, poverty weed, burdock, and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 450 pounds
Medium years - 300 pounds
Unfavorable years - 100 pounds

5. Soils

a. Soils associated with this site are very gravelly, droughty, usually a sandy texture, more than 20 inches deep over clean gravel or bedrock. The majority of the coarse fragments range from 2 mm to 3 inches in diameter, cover 50 to 75 percent of the surface and usually make up 40 to 50 percent by volume of the soil mass. These soil surfaces are relatively unstable from a geologic standpoint.

b. Soil taxonomic units which characterize this site are:

Larim, Calicott, Southace, Clapper

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is valuable for all seasons utilization by all kinds of domestic livestock.

2. Wood Products

Limited amounts of juniper is cut for firewood.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for low to moderate runoff. The soil cover complex numbers are:

Excellent	45
Good - high fair	55
Fair	70

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is low. Primary recreation use is hunting.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species found on this site are the prairie falcon (year round). Threatened or endangered plant species found on this site are cary penstemon.

7. Location of Typical Examples of this Site (To be determined at local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.15	6.7
Good	51 - 75	.12	8.3
Fair	26 - 50	.05	20.0
Poor	0 - 25	.03	33.3

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Western wheatgrass	2	2	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Canby bluegrass	1	1	1	1	1	1	1
Indian ricegrass	1	1	1	1	1	2	2
Prairie junegrass	2	2	2	2	2	2	2
Bluebunch wheatgrass	1	1	1	2	2	1	2
Sandberg bluegrass	2	2	2	2	2	2	2
Blue grama	2	2	2	2	2	2	2
Blue grama	2	2	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	2	2	2	2
Sand dropseed	2	2	2	3	3	3	3
Phlox	3	3	3	3	3	3	3
Larkspur (a)	2	2	2	2	2	2	2
Scarlet globemallow	2	2	2	2	2	2	2
Winterfat	1	1	1	1	1	1	1
Antelope birrerbrush	1	1	2	1	1	1	1
Big sagebrush	2	2	3	2	2	2	2
Black sagebrush	3	1	3	1	1	3	2
Juniper	3	3	3	2	3	3	3

(a) poisonous to cattle in the spring

9. Field Offices

Cody
Dubois
Greybull
Lander
Lovell
Powell
Riverton
Worland
Thermopolis

Technical Guide
Section II E
Major Land Resource Area (32) (46)

VERY SHALLOW (VS)
10-14" Foothills and Basins East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site usually occurs on steep slopes in an upland position. Elevation ranges from 4,500 to 7,000 feet in Wind River Basin.

2. Climatic Features

See attached description.

3. Native (climax) Vegetation

a. The climax plant community is characterized by plants which can withstand shallow depth of soil. Potential plant community is about 70% grasses and grass-like plants, 10% forbs and 20% woody plants.

b. Plant species and percentages found in the climax plant community by air-dry weight are:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Bluebunch wheatgrass	30-45
Needleandthread grass	T-10
Prairie junegrass	T-10
All following Grasses and Grass-like Plants	5-15*
Sandberg bluegrass	
Western wheatgrass	
Indian ricegrass	
Bottlebrush squirreltail	
Forbs	
All following Forbs	T-10*
Prairie thermposis	
Stemless humenoxys	
Wooly groundsel	
Phlox	
Evening primrose	

Woody Plants

Curlleaf mountain mahogany	10-15
Black sagebrush	T-10
Antelope bitterbrush	T-5
Juniper	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Canopy cover of Juniper on this site ranges from 5 to 15 percent.

d. Percent ground cover ranges from 15 to 25 percent.

e. As the range condition deteriorates, brush, conifers and forbs tend to become more dominant. Species that are not a part of this climax plant community but are likely to invade the site if conditions decline are cheatgrass, poverty weed, gumweed, burdock and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 500 pounds
Median years	- 350 pounds
Unfavorable years	- 250 pounds

5. Soils

a. The soil is generally is less than 10 inches deep, although there may exist small no-soil areas and/or pockets of deep soils. The bedrock will include all kinds except soft clay shales, igneous, and some volcanic. This site is generally droughty due to lack of moisture storing ability.

b. Soil taxonomic units which characterize this site are:

Travessilla

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is valuable for all seasons of use by all kinds of domestic

livestock, but because of accessibility, is more valuable for sheep.

2. Wood Products

Limited amounts of juniper is used for firewood.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for high runoff. The soil cover complex numbers are:

Excellent	85
Good - high fair	90
Fair	95

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is fair. Primary recreation uses are hunting, camping and hiking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species found on this site are the prairie falcon (year round). Threatened or endangered plant species found on this site are cary penstemon and sword townsendia.

7. Location of Typical Examples of Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	.15	6.7
Good	51 - 75	.12	8.3

Fair	26 - 50	.05	20.0
Poor	0 - 25	.03	33.3

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Western wheatgrass	2	2	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Indian ricegrass	1	1	1	1	1	2	2
Bottlebrush squirreltail	2	2	2	3	2	3	3
Bluebunch wheatgrass	1	1	1	2	2	1	2
Prairie junegrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
Prairie thermopsis	3	3	3	3	3	3	3
Stemless hymenoxys	3	3	3	3	3	3	3
Wooly groundsel	*	3	*	3	3	3	3
Evening primrose	3	3	3	3	3	3	3
Antelope bitterbrush	1	1	2	1	1	1	1
Black sagebrush	3	1	3	1	1	3	2
Curlleaf mountain mahogany	1	1	2	1	3	1	2
Juniper	3	3	3	2	3	3	3

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (43)(45)(46)

LOAMY (Ly)
15-19" Foothills and Mountains East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in the upland position, on all slopes. Elevations range from 6,000 to 9,000 feet.

2. Climatic Features

See attached climate description

3. Native (climax) Vegetation

a. The climax plant community is a sagebrush grass type. Grasses are dominant with 5-10% big sagebrush being a part of the climax community. Potential vegetation is 75% grasses and grass-like plants, 15% forbs and 10% woody plants.

b. Plant species and percentage composition of the plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Columbia needlegrass	10-25
Spike fescue	10-25
Idaho fescue	10-25
Bluebunch wheatgrass	5-15
All following Grasses and Grass-like Plants	10-25*
Mountain brome	
Nodding brome	
Pumpelly brome	
Slender wheatgrass	
California oatgrass	
Big bluegrass	
Canby bluegrass	
Montana wheatgrass	
Spike trisetum	
Rhizomatous wheatgrass	
Western wheatgrass	
Thickspike wheatgrass	

Upland
Lettermans needlegrass
Needleandthread grass
Prairie junegrass
Sandberg bluegrass
One-spike oatgrass
Mutton bluegrass

Forbs

All following Forbs 5-15*
Phlox
Chickweed
Pussytoes
Western yarrow
Aster
Larkspur
Lupine

Woody Plants

Big sagebrush T-10
Rabbitbrush T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover is 60-70 percent.

d. As the ecological condition changes by deterioration, big sagebrush and rabbitbrush become more dominant. Species most likely to invade the site as cover deteriorates are cheatgrass, gumweed, Canada thistle and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 1,600 pounds
Median years - 1,350 pounds
Unfavorable years - 1,100 pounds

5. Soils

a. The soils associated with this site are very fine sandy loams, loams, silt loams, light sandy clay loams, light silty clay loam and light clay loams, provided the topsoil is not less than 3 inches. These soils are 20 inches or more in depth. They

take up moisture readily and the plant soil moisture relationships are good.

b. Soil taxonomic units which characterize this site are:

Burnette, Lucky Star, Bachus, Inchau, Lymanson, Nathrop, Stubbs, Woosley, Decross, Morset

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site is dominated by grasses. Its accessibility to livestock makes it valuable for spring, summer, and fall use by all kinds of livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate runoff. The soil cover complex numbers are:

Excellent	55
Good - high fair	65
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is moderate. Primary recreation uses are hunting, camping and hiking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the peregrine falcon (summer) and the blackfooted ferret. Threatened or endangered plant species on this site are payson penstemon (Fremont Co.).

7. Location of Typical Examples of Site (To be determined at local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.60	1.7
Good	51 - 75	0.50	2.0
Fair	26 - 50	0.30	3.3
Poor	0 - 25	0.15	6.7

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE GELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Slender wheatgrass	1	2	1	2	2	2	2
Big bluegrass	1	1	1	1	1	1	1
Canby bluegrass	1	1	1	1	1	1	1
Mountain brome	1	1	2	2	3	2	2
Nodding brome	1	1	2	2	3	2	2
Pumpelly brome	1	1	2	2	3	2	2
Columbia needlegrass	1	1	2	2	2	2	2
California oatgrass	1	1	1	2	2	2	2
Spike fescue	1	2	1	1	2	2	2
Idaho fescue	1	1	1	1	1	1	1
Bluebunch wheatgrass	1	1	1	2	2	2	2
Montana wheatgrass	2	2	2	2	2	2	2
Spike trisetum	1	2	1	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass		2	2	2	2	2	2

Upland sedges	2	2	2	2	2	2	2
Lettermans needlegrass	1	1	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Prairie junegrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
One-spike oatgrass	2	1	2	1	2	2	2
Mutton bluegrass	1	1	1	1	1	1	1
Phlox	3	3	3	3	3	3	3
Chickweed	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Western yarrow	3	3	3	3	3	3	3
Aster	3	3	3	3	3	3	3
Larkspur (a)	2	2	2	2	2	2	2
Lupine	2	2	2	2	2	2	2
Big sagebrush	2	2	3	2	2	2	2
Rabbitbrush	3	1	3	2	1	3	2

(a) poisonous to cattle in the spring

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (43)(45)(46)

CLAYEY (Cy)
15-19" Foothills and Mountains East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site occurs in upland positions on all slopes. Elevations range from 6,000 to 9,000 feet.

2. Climatic Features

See attached climate description

3. Native (climax) Vegetation

a. The climax plant community is a sagebrush grass type. Grasses are dominant with 5-10% big sagebrush being a part of the climax community. Potential vegetation is 75% grasses and grass-like plants, 15% forbs and 10% woody plants.

b. Plant species and percentage composition of the plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Columbia needlegrass	10-25
Spike fescue	5-15
Idaho fescue	5-15
Rhizomatous wheatgrass	5-15
Western wheatgrass	
Thickspike wheatgrass	
Bluebunch wheatgrass	T-10
All following Grasses and Grass-like Plants	10-20*
Sandberg bluegrass	
Lettermans needlegrass	
Prairie junegrass	
Bottlebrush squirreltail	
One-spike oatgrass	
Mutton bluegrass	
Slender wheatgrass	
Canby lbuegrass	
Mountain brome	

Nodding brome
Pumpelly brome
Montana wheatgrass
Spike trisetum

Forbs

All following Forbs 5-15*
Phlox
Chickweed
Pussytoes
Western yarrow
Larkspur
Lupine
Wyethia

Woody Plants

Big sagebrush T-10

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover is 50-60 percent.

d. As the ecological condition changes by deterioration, big sagebrush will become more dominant. Species most likely to invade the site as cover deteriorates are prickly pear, cheatgrass, gumweed, poverty weed and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 1,600 pounds
Median years - 1,300 pounds
Unfavorable years - 1,100 pounds

5. Soils

a. The soils associated with this site are silty clays. The finer portions of sandy clay loam silty clay loams, and clays which develop severe cracks or become hard when dry and sticky when wet. Top soil must be at least 2 inches deep and a minimum soil depth of 20 inches. These soils do not take up moisture as readily as lighter textured soils; however, most of the moisture comes as snow and this helps overcome this factor. Water intake rate slows down as range condition and litter accumulation decreases.

b. Soil taxonomic units which characterize this site are:

Turk

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage during spring, summer and fall months for all kinds of livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for high runoff. The soil cover complex numbers are:

Excellent	65
Good - high fair	75
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is moderate. Primary recreation uses are hunting, hiking and camping.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the peregrine falcon (summer) and the blackfooted ferret. There are no known threatened or endangered plant species on this site.

7. Location of Typical Examples of Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.60	1.7
Good	51 - 75	0.50	2.0
Fair	26 - 50	0.30	3.3
Poor	0 - 25	0.15	6.7

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE &ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Slender wheatgrass	1	2	1	2	2	2	2
Canby bluegrass	1	1	1	1	1	1	1
Mountain brome	1	1	2	2	3	2	2
Nodding brome	1	1	2	2	3	2	2
Pumpelly brome	1	1	2	2	3	2	2
Columbia needlegrass	1	1	2	2	2	2	2
Spike fescue	1	2	1	1	2	2	2
Idaho fescue	1	1	1	1	1	1	1
Blueburch wheatgrass	1	1	1	2	2	2	2
Montana wheatgrass	2	2	2	2	2	2	2
Spike trisetum	1	2	1	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Lettermans needlegrass	1	1	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Prairie junegrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
One-spike oatgrass	2	1	2	1	2	2	2
Mutton bluegrass	1	1	1	1	1	1	1
Bottlebrush squirreltail	2	2	2	2	2	2	2
Phlox	3	3	3	3	3	3	3
Chickweed	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Western yarrow	3	3	3	3	3	3	3

Wyethia	3	3	3	3	3	3	3
Larkspur (a)	2	2	2	2	2	2	2
Lupine	2	2	2	2	2	2	2
Big sagebrush	2	2	3	2	2	2	2

(a) poisonous to cattle in the spring

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (43)(45)(46)

SHALLOW LOAMY (SwLy)
15-19" Foothills and Mountains East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site is usually found on steep slopes in the upland position; however, it may be found on all slopes in all positions. Elevations range from 6,000 to 9,000 feet.

2. Climatic Features

See attached climate description

3. Native (climax) Vegetation

a. The climax plant community is dominated by grasses with big and/or black sagebrush being a part of the composition (about 5% each). Potential vegetation is 75% grasses and grass-like plants, 10% forbs and 15% woody plants.

b. Plant species and percentage composition of the plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Columbia needlegrass	10-25
Idaho fescue	10-25
Spike fescue	10-25
One-spike oatgrass	T-10
Prairie junegrass	T-10
Rhizomatous wheatgrass	T-10
Western wheatgrass	
Thickspike wheatgrass	
All following Grasses and Grass-like Plants	10-20*
California oatgrass	
Bluebunch wheatgrass	
Montana wheatgrass	
Spike trisetum	
Upland sedges	
Needleandthread grass	
Sandberg bluegrass	
Slender wheatgrass	

Big bluegrass
Canby bluegrass
Mountain brome
Nodding brome
Pumpelly brome
Indian ricegrass

Forbs

All following Forbs T-10*
Phlox
Chickweed
Pussytoes
Aster
Western yarrow
Larkspur
Lupine

Woody Plants

Mountain mahogany T-10
Big sagebrush T-5
Black sagebrush T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover is 50-60 percent.

d. As the ecological condition changes by deterioration, big sagebrush and black sagebrush become more dominant. Species most likely to invade the site as cover deteriorates are cheatgrass, goldenweed, gumweed, and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 1,000 pounds
Median years - 850 pounds
Unfavorable years - 500 pounds

5. Soils

a. The soil depth ranges from 10 to20 inches over bedrock of any kind except igneous, which is virtually impenetrable to plant roots. Soil textures range from a avery fine sandy loam to the light sandy clay loams, light silty clay, and clay loams. Thin,

ineffectual layers of other textures are disregarded. Plant composition on this site is similar to loamy; however, due to shallow depths, this site has less plant rooting depth and water holding capacity is reduced. Plant density is also reduced.

b. Soil taxonomic units which characterize this site are:

Chittum, Irigul, Jenkinson, Starley, Starman

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage during spring, summer and fall months for all kinds of livestock.

2. Wood Products

None.

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for moderate to high runoff. The soil cover complex numbers are:

Excellent	70
Good - high fair	75
Fair	80

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is moderate. Primary uses are huntin, hiking, and camping.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animal species on this site are the peregrine falcon (summer). Threatened or endangered plant species on this site are payson penstemon (Fremont Co.).

7. Location of Typical Examples of Site (To be determined at the local field office level)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.40	2.5
Good	51 - 75	0.30	3.3
Fair	26 - 50	0.20	5.0
Poor	0 - 25	0.10	10.0

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE & ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Slender wheatgrass	1	2	1	2	2	2	2
Big bluegrass	1	1	1	1	1	1	1
Canby bluegrass	1	1	1	1	1	1	1
Mountain brome	1	1	2	2	3	2	2
Nodding brome	1	1	2	2	3	2	2
Pumpelly brome	1	1	2	2	3	2	2
Columbia needlegrass	1	1	2	2	2	2	2
California oatgrass	1	1	1	2	2	2	2
Spike fescue	1	2	1	1	2	2	2
Idaho fescue	1	1	1	1	1	1	1
Bluebunch wheatgrass	1	1	1	2	2	2	2
Montana wheatgrass	2	2	2	2	2	2	2
Spike trisetum	1	2	1	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2

Thickspike wheatgrass	2	2	2	2	2	2	2
Upland sedges	2	2	2	2	2	2	2
Needleandthread grass	1	1	1	1	1	1	1
Prairie junegrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
One-spike oatgrass	2	1	2	1	2	2	2
Indian ricegrass	1	1	1	1	1	1	1
Phlox	3	3	3	3	3	3	3
Chickweed	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Western yarrow	3	3	3	3	3	3	3
Aster	3	3	3	3	3	3	3
Larkspur (a)	2	2	2	2	2	2	2
Lupine	2	2	2	2	2	2	2
Big sagebrush	2	2	3	2	2	2	2
Black sagebrush	3	1	3	1	1	3	2
Mountain mahogany	1	1	2	1	3	1	2

(a) poisonous to cattle in spring

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (43)(45)(46)
CLAYEY
SHALLOW (ShCy)
15-19" Foothills and Mountains East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site usually occurs in the upland position; however, it may be found on all slopes and positions. Elevations on this site range from 6,000 to 9,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by grasses. Big sagebrush may make up about 5% of the climax community. Potential vegetation is 75% grasses and grass-like plants, 15% forbs and 10% woody plants.

b. Plant species and percentage composition of the plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Idaho fescue	10-20
Columbia needlegrass	5-15
Bluebunch wheatgrass	5-15
Rhizomatous wheatgrass	5-15
Western wheatgrass	
Thickspike wheatgrass	
Spike fescue	T-10
All following Grasses and Grass-like Plants	10-20*
Sandberg bluegrass	
Bogglebrush squirreltail	
Indian ricegrass	
Montana wheatgrass	
Spike trisetum	
Slender wheatgrass	
Canby bluegrass	
Mountain brome	
Nodding brome	

Pumpelly brome
Mountain muhly

Forbs

All following Forbs	T-15*
Phlox	
Aster	
Chickweed	
Larkspur	
Lupine	
Western yarrow	
Pussytoes	

Woody Plants

Big sagebrush	5-10

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Approximate percent ground cover is 50-60 percent.

d. As the ecological condition changes by deterioration, big sagebrush will become more dominant. Species most likely to invade the site as cover deteriorates are sandberg bluegrass, gumweed, and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years	- 1,000 pounds
Median years	- 850 pounds
Unfavorable years	- 500 pounds

5. Soils

a. The soil depth ranges from 10 to 20 inches deep over clay shale bedrock, which is virtually impenetrable to plant roots. Soil textures included in this site are silty clay, the finer portions of sandy clay loam, clay loam, or silty clay loams, and all clays. Thin ineffectual layers of other soils textures are disregarded. These soils do not take up moisture as readily as the lighter textured soils; however, most moisture comes as snow and this helps overcome this factor.

b. Soil taxonomic units which characterize this site are:

Devoe

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage in spring, summer and fall months for all kinds of livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for high runoff. The soil cover complex numbers are:

Excellent	75
Good - High fair	80
Fair	85

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential for this site is low. Primary uses are hunting and hiking.

6. Threatened or Endangered Plants and Animals

Threatened or endangered animals on this site are the peregrine falcon (summer). Threatened or endangered plant species on this site are, payson penstemon (Fremont Co.).

7. Location of Typical Examples of Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.40	2.5
Good	51 - 75	0.30	3.3
Fair	26 - 50	0.20	5.0
Poor	0 - 25	0.10	10.0

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMAL USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE & ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Slender wheatgrass	1	2	1	2	2	2	2
Canby bluegrass	1	1	1	1	1	1	1
Mountain brome	1	1	2	2	3	2	2
Nodding brome	1	1	2	2	3	2	2
Pumpelly brome	1	1	2	2	3	2	2
Columbia needlegrass	1	1	2	2	2	2	2
Spike fescue	1	2	1	1	2	2	2
Idaho fescue	1	1	1	1	1	1	1
Bluebunch wheatgrass	1	1	1	2	2	2	1
Montana wheatgrass	2	2	2	2	2	2	2
Spike trisetum	1	2	1	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	2	2	2	2
Indian ricegrass	1	1	1	1	1	1	1
Prairie junegrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
Mountain muhly	2	2	2	2	3	2	2

Phlox	3	3	3	3	3	3	3
Chickweed	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Western yarrow	3	3	3	3	3	3	3
Aster	3	3	3	3	3	3	3
Larkspur (a)	2	2	2	2	2	2	2
Lupine	2	2	2	2	2	2	2
Big sagebrush	2	2	3	2	2	2	2

(a) poisonous to cattle in the spring

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

Technical Guide
Section II E
Major Land Resource Area (43)(45)(46)

VERY SHALLOW (VS)
15-19" Foothills and Mountains East
Correlated Range Site No._____

RANGE SITE DESCRIPTION

A. PHYSICAL CHARACTERISTICS

1. Physiographic Features

This site usually occurs on steep slopes in an upland position. Elevations range from 6,000 to 9,000 feet.

2. Climatic Features

See attached climate description.

3. Native (climax) Vegetation

a. The climax plant community is dominated by grasses; however, forbs are common with the climax composition. Potential vegetation is 70% grasses and grass-like plants, 15% forbs and 15% woody plants.

b. Plant species and percentage composition of the plant community by air-dry weight:

SPECIES	PERCENT
Grasses and Grass-like Plants	
Columbia needlegrass	10-25
Bluebunch wheatgrass	10-25
Mountain muhly	T-10
Idaho fescue	T-10
Rhizomatous wheatgrass	T-10
Western wheatgrass	
Thickspike wheatgrass	
Prairie junegrass	T-10
All following Grasses and Grass-like Plants	T-10*
Sandberg bluegrass	
One-spike oatgrass	
Slender wheatgrass	
Montana wheatgrass	
Spike trisetum	
Forbs	
All following Forbs	5-15*

Phlox
Aster
Chickweed
Pussytoes
Western yarrow
Larkspur
Stonecrop
Sandwort

Woody Plants

Mountain mahogany	10-25
Antelope bitterbrush	T-10
Big sagebrush	T-5
Black sagebrush	T-5
Limber pine	T-5

*Of plants in these groups, no more than 5% of any species is allowable in the potential plant community.

c. Limber pine occurs on this site as scattered individual trees. They are not present in sufficient quantity to be of commercial value.

d. Approximate percent ground cover is 20-30 percent.

e. As the ecological condition changes by deterioration big sagebrush and black sagebrush become more dominant. Species most likely to invade the site as cover deteriorates are annual forbs, cheatgrass, poverty weed, gumweed, burdock and stickseed.

4. Total Annual Production (Pounds per Acre Air-dry Weight)

Favorable years - 800 pounds
Median years - 600 pounds
Unfavorable years - 400 pounds

5. Soils

a. The soil is generally less than 10 inches deep although there may exist small no-soil areas and/or pockets of deep soil. The bedrock will include all kinds except soft clay shales, igneous and some volcanic.

b. Soil taxonomic units which characterize this site are:

Whaley, Starley

c. Complete soil descriptions are available in the soil survey descriptive legend.

B. MAJOR USES AND INTERPRETATIONS FOR:

1. Grazing

This site provides good forage during spring, summer, and fall for all classes of livestock.

2. Wood Products

None

3. Wildlife

See attached wildlife interpretations sheet.

4. Watershed (Hydrologic Interpretations)

This range site has a potential for high runoff. The soil cover complex numbers are:

Excellent	85
Good - high fair	90
Fair	95

(See Section 4, SCS National Engineering Handbook for runoff quantities and hydrologic curves.)

5. Recreation and Natural Beauty

Recreation potential is low. Primary use is hunting.

6. Threatened or Endangerd Plants and Animals

Threatened or endangered animal species on this site are the prairie falcon. Threatened or endangered plant species on this site are fremont bladderpod and payson penstemon (Fremont Co.).

7. Location of Typical Example of Site (To be determined at the local field office level.)

8. Other Pertinent Information

GUIDE TO SUGGESTED INITIAL STOCKING RATE

Condition Class	Percent Climax Vegetation	AUM's/Acre	Acres/AUM
Excellent	76 - 100	0.20	5.0
Good	51 - 75	0.15	6.7
Fair	26 - 50	0.10	10.0
Poor	0 - 25	0.05	20.0

RELATIVE FORAGE QUALITY OF PLANTS FOR ANIMALS USE

1 - Preferred
2 - Desirable
3 - Undesirable
* - Poisonous

PLANT SPECIES	CATTLE & ELK	SHEEP	HORSES	DEER	ANTELOPE	MOOSE	BIG HORN SHEEP
Mountain muhly	2	2	2	2	3	2	2
Columbia needlegrass	1	1	2	2	2	2	2
Idaho fescue	1	1	1	1	1	1	1
Bluebunch wheatgrass	1	1	1	2	2	2	1
Slender wheatgrass	1	2	1	2	2	2	2
Montana wheatgrass	2	2	2	2	2	2	2
Spike trisetum	1	2	1	2	2	2	2
Western wheatgrass	2	2	2	2	2	2	2
Thickspike wheatgrass	2	2	2	2	2	2	2
Prairie junegrass	2	2	2	2	2	2	2
Sandberg bluegrass	2	2	2	2	2	2	2
One-spike oatgrass	2	1	2	1	2	2	2
Phlox	3	3	3	3	3	3	3
Aster	3	3	3	3	3	3	3
Chickweed	3	3	3	3	3	3	3
Pussytoes	3	3	3	3	3	3	3
Western yarrow	3	3	3	3	3	3	3
Larkspur (a)	2	2	2	2	2	2	2
Stonecrop	3	3	3	3	3	3	3
Sandwort	3	3	3	3	3	3	3
Antelope bitterbrush	1	1	2	1	1	2	1
Mountain mahogany	1	1	3	1	3	2	1
Big sagebrush	2	2	3	2	2	2	2
Black sagebrush	3	1	3	1	1	3	2

(a) poisonous to cattle in the spring

9. Field Offices

Cody	Lander	Riverton
Dubois	Lovell	Worland
Greybull	Powell	Thermopolis

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Denver, CO 80225

Soil and Land Use Technology, Inc.

11021 Wood Elves Way
Columbia, Maryland 21044